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Service Manual

Contents **Page**

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

1.1 Technical Specifications

1.1.1 Vision

Display type	:	DV-LCD-IPS
	:	15:9
Screen size	:	32”
Resolution (HxV pixels)	:	1280x768 (WXGA)
Contrast ratio	:	350:1
Light output (cd/m^2)	:	450
Viewing angle (HxV deg.)	:	176x176
Tuning system	:	PLL
Colour systems	:	PAL B/G, D/K, I
	:	SECAM B/G, D/K, L/L’
Video playback	:	NTSC 4.43/3.58,
	:	NTSC Play Back,
	:	PAL 60,
	:	PAL B/G Play Back,
	:	SECAM Play Back
Channel selections	:	100 presets
	:	UVSH
Supported formats	:	VGA (640x480)
	:	VGA (720x400)
	:	VGA (640x350)
	:	MAC (640x480)
	:	MAC (832x624)
	:	SVGA (800x600)
	:	XVGA (1024x768)
	:	WXGA (1280x768)

1.1.2 Sound

Sound systems	:	BI NICAM B/G
	:	2CS B/G
	:	NICAM B/G (5.5-5.85)
	:	NICAM D/K (6.5-5.85)
	:	NICAM I (6.0-6.52)
	:	NICAM L (6.5-5.85)
	:	FM/FM (5.5-5.74 B/G)
Maximum power (W_{RMS})	:	2 x 10

1.1.3 Miscellaneous

Power supply:		
- Mains voltage (V_{AC})	:	220 - 240
- Mains frequency (Hz)	:	50 / 60
Ambient conditions:		
- Ambient temperature (°C)	:	+5 to +40
- Maximum humidity	:	90% R.H.
Power consumption		
- Normal operation (W)	:	185
- Stand-by (W)	:	< 2

1.2 Connection Overview

Note: The following connector colour abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, and Ye= Yellow.

1.2.1 Rear Connections

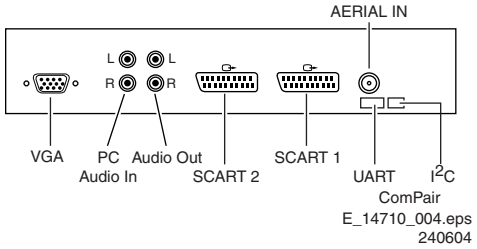

Figure 1-1 Rear connections

VGA: Video RGB - In

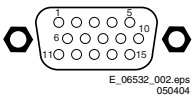

Figure 1-2 VGA connector

1	- Video Red	0.7 V_{PP} / 75 ohm	⊕
2	- Video Green	0.7 V_{PP} / 75 ohm	⊕
3	- Video Blue	0.7 V_{PP} / 75 ohm	⊕
4	- n.c.		
5	- Ground	Gnd	⏚
6	- Ground Red	Gnd	⏚
7	- Ground Green	Gnd	⏚
8	- Ground Blue	Gnd	⏚
9	- +5V_DC	+5 V_{DC}	⊕
10	- Ground Sync	Gnd	⏚
11	- n.c.		
12	- DDC_SDA	DDC data	⊕
13	- H-sync	0 - 5 V	⊕
14	- V-sync	0 - 5 V	⊕
15	- DDC_SCL	DDC clock	⊕

Cinch: PC Audio - In

Rd	- Audio - R	0.5 V_{RMS} / 10 kohm
Wh	- Audio - L	0.5 V_{RMS} / 10 kohm

Cinch: Audio - Out

Rd	- Audio - R	0.5 V_{RMS} / 10 kohm
Wh	- Audio - L	0.5 V_{RMS} / 10 kohm

SCART 1: Video RGB/YUV-In, CVBS-In/Out, Audio-In/Out

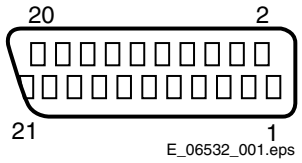

Figure 1-3 SCART connector

1	- Audio R	0.5 V_{RMS} / 1 kohm	
2	- Audio R	0.5 V_{RMS} / 10 kohm	
3	- Audio L	0.5 V_{RMS} / 1 kohm	
4	- Ground Audio	Gnd	
5	- Ground Blue	Gnd	
6	- Audio L	0.5V_{RMS} / 10 kohm	
7	- Video Blue/U	0.7 V_{PP} / 75 ohm	
8	- Function Select	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	
9	- Ground Green	Gnd	
10	- n.c.		
11	- Video Green/Y	0.7 or 1 V_{PP} / 75 ohm	
12	- n.c.		
13	- Ground Red	Gnd	
14	- n.c.		
15	- Video Red/V	0.7 V_{PP} / 75 ohm	
16	- FBL	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm	
17	- Ground Video	Gnd	
18	- Ground FBL	Gnd	
19	- Video CVBS	1 V_{PP} / 75 ohm	
20	- Video CVBS	1 V_{PP} / 75 ohm	
21	- Shield	Gnd	

SCART 2: Video CVBS/YC - In/Out, Audio - In/Out

1	- Audio R	0.5 V_{RMS} / 1 kohm	
2	- Audio R	0.5 V_{RMS} / 10 kohm	
3	- Audio L	0.5 V_{RMS} / 1 kohm	
4	- Ground Audio	Gnd	
5	- Ground Blue	Gnd	
6	- Audio L	0.5 V_{RMS} / 10 kohm	
7	- Video C	0.7 V_{PP} / 75 ohm	
8	- Function Select	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	
9	- Ground Green	Gnd	
10	- Easylink P50	0 - 5 V / 4.7 kohm	
11	- n.c.		
12	- n.c.		
13	- Ground Red	Gnd	
14	- Ground P50	Gnd	
15	- Video C	0.7 V_{PP} / 75 ohm	
16	- n.c.		
17	- Ground Video	Gnd	
18	- n.c.		
19	- Video CVBS	1 V_{PP} / 75 ohm	
20	- Video Y/CVBS	1 V_{PP} / 75 ohm	
21	- Shield	Gnd	

Aerial - In

	- IEC-type	Coax, 75 ohm

1.2.2 Side I/O Connections

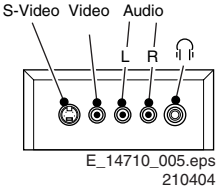

Figure 1-4 Side I/O connections

SVHS (Hosiden): Video Y/C - In

1	- Ground Y	Gnd	
2	- Ground C	Gnd	
3	- Video Y	1 V_{PP} / 75 ohm	
4	- Video C	0.3 V_{PP} / 75 ohm	

Cinch: Video CVBS - In, Audio - In

Ye	- Video CVBS	1 V_{PP} / 75 ohm	
Wh	- Audio L	0.5 V_{RMS} / 10 kohm	
Rd	- Audio R	0.5 V_{RMS} / 10 kohm	

Mini Jack: Audio Headphone - Out

Bk	- Head phone	32 - 600 ohm / 10 mW	

1.3 Chassis Overview

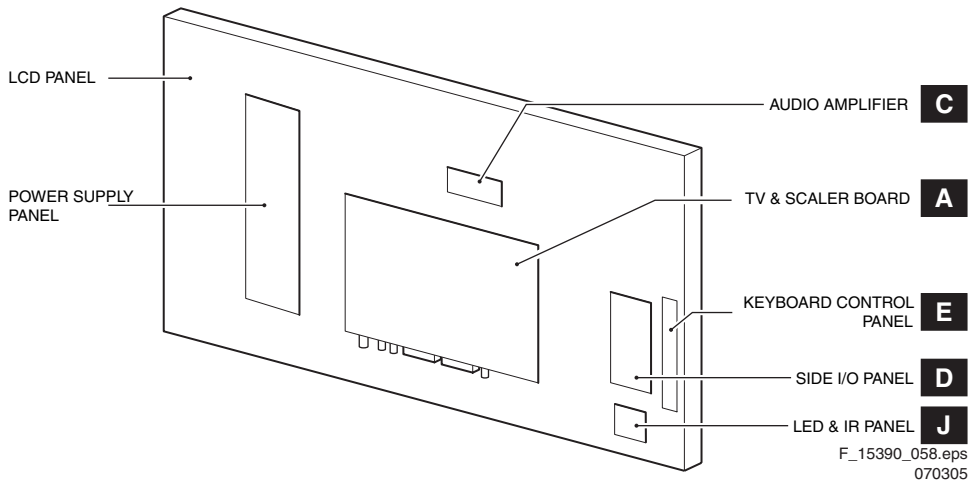

Figure 1-5 Chassis overview

2. Safety Instructions, Warnings, and Notes

Index of this chapter:

2.1 Safety Instructions

Safety regulations require that **during** a repair:

- Connect the set to the mains via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the mains lead for external damage.
- Check the strain relief of the mains cord for proper function.
- Check the electrical DC resistance between the mains plug and the secondary side (only for sets which have a mains isolated power supply):
  1. Unplug the mains cord and connect a wire between the two pins of the mains plug.
  2. Set the mains switch to the "on" position (keep the mains cord unplugged!).
  3. Measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
  4. Switch "off" the set, and remove the wire between the two pins of the mains plug.
- Check the cabinet for defects, to avoid touching of any inner parts by the customer.

2.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ⚠). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential. Available ESD protection equipment:
  – Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.
  – Wristband tester 4822 344 13999.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.3 Notes

2.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (⊓⊓) and without (⊼⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (⏻) and in stand-by (⏻). These values are indicated by means of the appropriate symbols.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.
- Manufactured under license from Dolby Laboratories. “Dolby”, “Pro Logic” and the “double-D symbol”, are trademarks of Dolby Laboratories.

2.3.2 Schematic Notes

- All resistor values are in ohms and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 ohm).
- All capacitor values are given in micro-farads (μ= x10^{-6}), nano-farads (n= x10^{-9}), or pico-farads (p= x10^{-12}).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Electrical Replacement Parts List. Therefore, always check this list when there is any doubt.

2.3.3 Rework on BGA (Ball Grid Array) ICs

General

Although (LF)BGA assembly yields are very high, there may still be a requirement for component rework. By rework, we mean the process of removing the component from the PWB and replacing it with a new component. If an (LF)BGA is removed from a PWB, the solder balls of the component are deformed drastically so the removed (LF)BGA has to be discarded.

Device Removal

As is the case with any component that, it is essential when removing an (LF)BGA, the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform temperature reduces the chance of warping the PWB.
To do this, we recommend that the board is heated until it is certain that all the joints are molten. Then carefully pull the component off the board with a vacuum nozzle. For the appropriate temperature profiles, see the IC data sheet.

Area Preparation

When the component has been removed, the vacant IC area must be cleaned before replacing the (LF)BGA.
Removing an IC often leaves varying amounts of solder on the mounting lands. This excessive solder can be removed with either a solder sucker or solder wick. The remaining flux can be removed with a brush and cleaning agent.
After the board is properly cleaned and inspected, apply flux on the solder lands and on the connection balls of the (LF)BGA.
Note: Do not apply solder paste, as this has shown to result in problems during re-soldering.

Device Replacement
The last step in the repair process is to solder the new component on the board. Ideally, the (LF)BGA should be aligned under a microscope or magnifying glass. If this is not possible, try to align the (LF)BGA with any board markers. So as not to damage neighbouring components, it may be necessary to reduce some temperatures and times.

More Information
For more information on how to handle BGA devices, visit this URL: *http://www.atyourservice.ce.philips.com* (needs subscription). After login, select “Magazine”, then go to “Workshop Information”. Here you will find Information on how to deal with BGA-ICs.

2.3.4 Lead Free Solder

Philips CE is going to produce lead-free sets (PBF) from 1.1.2005 onwards.

Figure 2-1 Lead-free logo

This sign normally has a diameter of 6 mm, but if there is less space on a board also 3 mm is possible.

Regardless of this logo (is not always present), one must treat all sets from this date onwards according to the following rules.

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin Philips SAC305 with order code 0622 149 00106. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able
  - To reach at least a solder-tip temperature of 400°C.
  - To stabilise the adjusted temperature at the solder-tip.
  - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature around 360°C - 380°C is reached and stabilised at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will rise drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch “off” unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly to avoid mixed regimes. If not to avoid, clean carefully the solder-joint from old tin and re-solder with new tin.
- Use only original spare-parts listed in the Service-Manuals. Not listed standard material (commodities) has to be purchased at external companies.
- Special information for lead-free BGA ICs: these ICs will be delivered in so-called "dry-packaging" to protect the IC against moisture. This packaging may only be opened short before it is used (soldered). Otherwise the body of the IC gets "wet" inside and during the heating time the structure of the IC will be destroyed due to high (steam-)pressure inside the body. If the packaging was opened before usage, the IC has to be heated up for some hours (around 90°C) for drying (think of ESD-protection!). **Do not re-use BGAs at all**!
- For sets produced before 1.1.2005, containing leaded soldering tin and components, all needed spare parts will be available till the end of the service period. For the repair of such sets nothing changes.

In case of doubt whether the board is lead-free or not (or with mixed technologies), you can use the following method:

- Always use the highest temperature to solder, when using SAC305 (see also instructions below).
- De-solder thoroughly (clean solder joints to avoid mix of two alloys).

Caution: For BGA-ICs, you **must** use the correct temperature-profile, which is coupled to the 12NC. For an overview of these profiles, visit the website *www.atyourservice.ce.philips.com* (needs subscription, but is not available for all regions)
You will find this and more technical information within the "Magazine", chapter "Workshop information".
For additional questions please contact your local repair help desk.

2.3.5 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions - reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

3. Directions for Use

You can download this information from the following websites:
http://www.philips.com/support
http://www.p4c.philips.com

4. Mechanical Instructions

Index of this chapter:

Notes:

- Figures below can deviate slightly from the actual situation, due to the different set executions.
- Follow the disassembling instructions in described order.

4.1 Cable Dressing

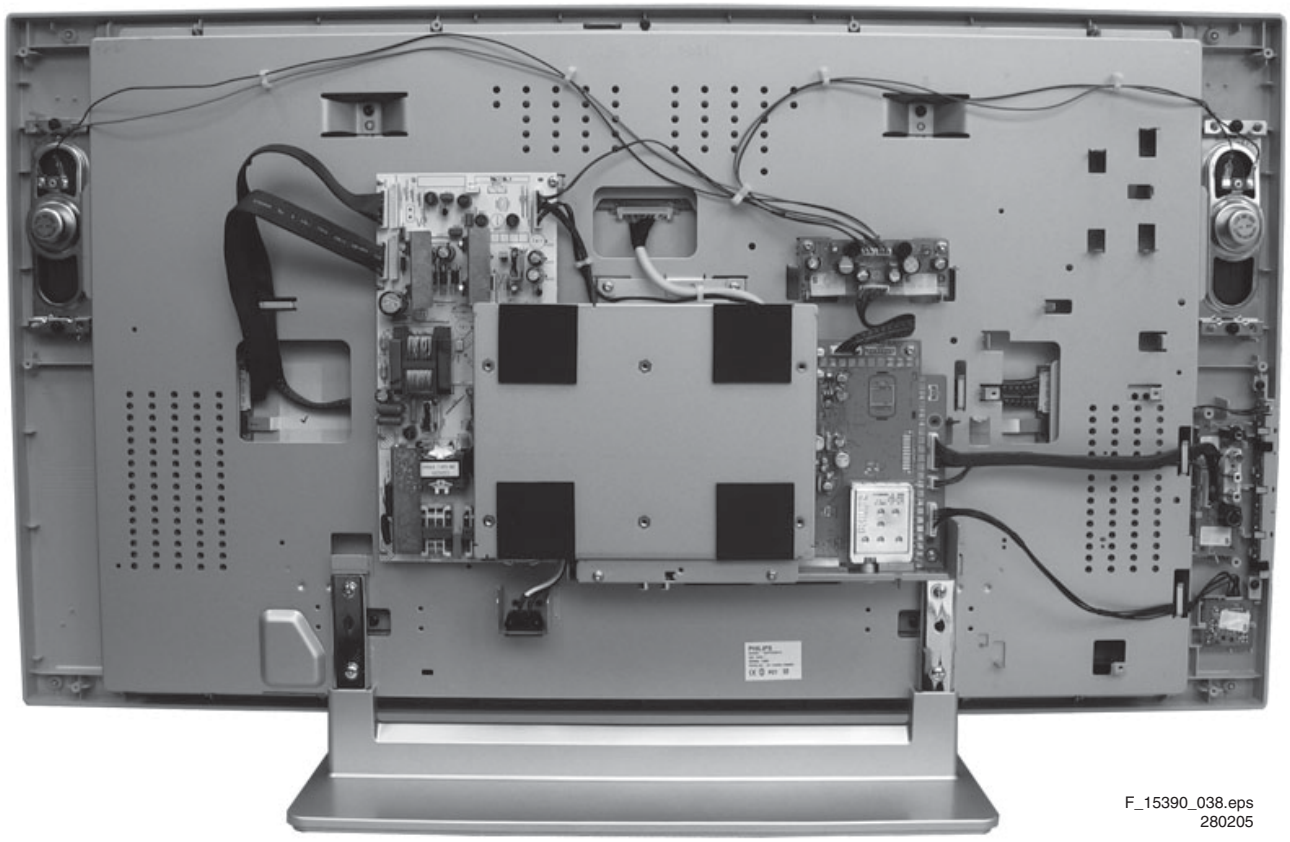

Figure 4-1 Cable dressing

4.2 Service Position

First, put the TV set in its service position. Therefore, place it upside down on a table top (use a protection sheet or foam bars).

4.2.1 The Foam Bars

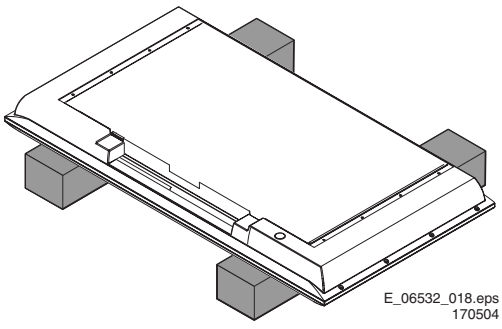

Figure 4-2 Foam bars

The foam bars (order code 3122 785 90580) can be used for all types and sizes of Flat TVs. By laying the plasma or LCD TV flat on the (ESD protective) foam bars, a stable situation is created to perform measurements and alignments. By first placing a mirror flat on the table under the TV you can easily see if something is happening on the screen.

4.3 Assy/Panel Removal

4.3.1 Rear Cover

Warning: Disconnect the mains power cord before you remove the rear cover.

1. Remove the 11 screws that secure the rear cover. The screws are located at the top, bottom, left and right sides.
2. Lift the rear cover from the cabinet cautiously. Make sure that wires and other internal components are not damaged during cover removal.

4.3.2 Side I/O Panel

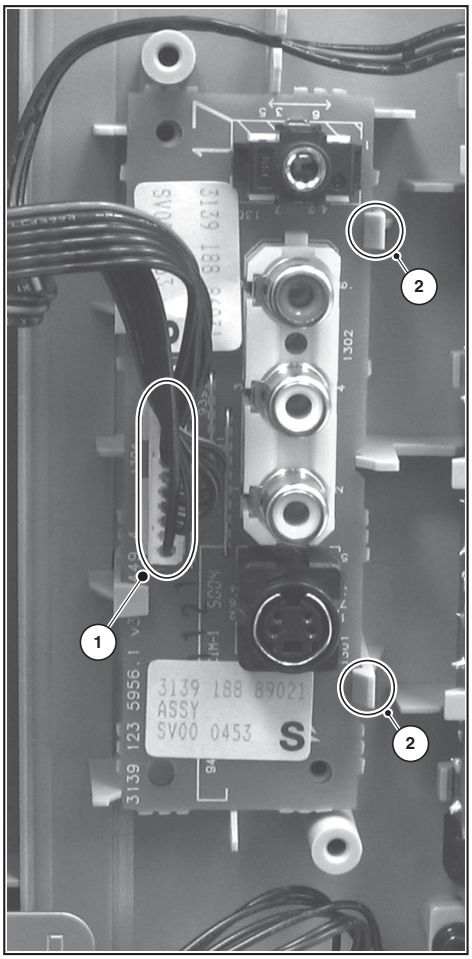

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Figure 4-3 Side I/O panel

1. Disconnect the cable (1) from the panel.
2. Release the two fixation clamps (2) and lift the panel out of the bracket.

4.3.3 LED Panel

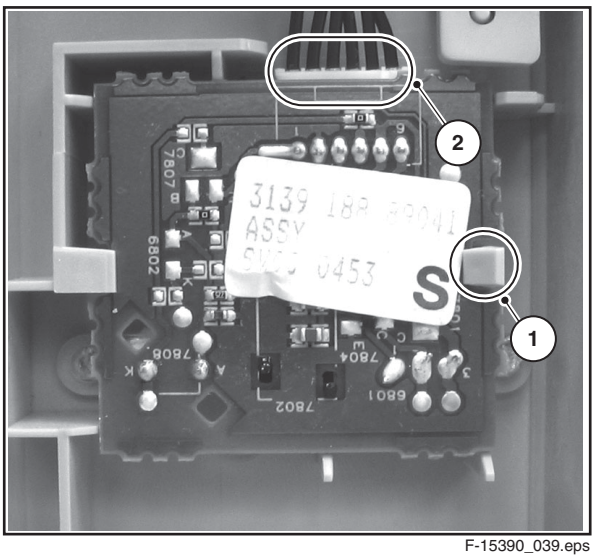

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Figure 4-4 LED panel

1. Release the fixation clamp (1) and take the panel out of the bracket.
2. Disconnect the cable (2) from the panel.

4.3.4 Keyboard Control Panel

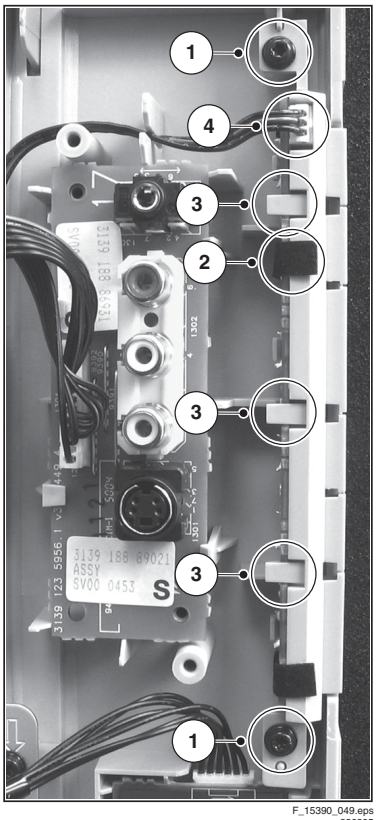

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Figure 4-5 Keyboard control panel

1. Remove the two fixation screws (1) from the bracket and take out the panel/bracket combination.
2. Remove the fixation tape (2) from the panel/bracket combination.
3. Release the three fixation clamps (3) and lift the panel out of the bracket.
4. Disconnect the cable (4) from the panel.

4.3.5 Cover Shield of TV & Scaler Board

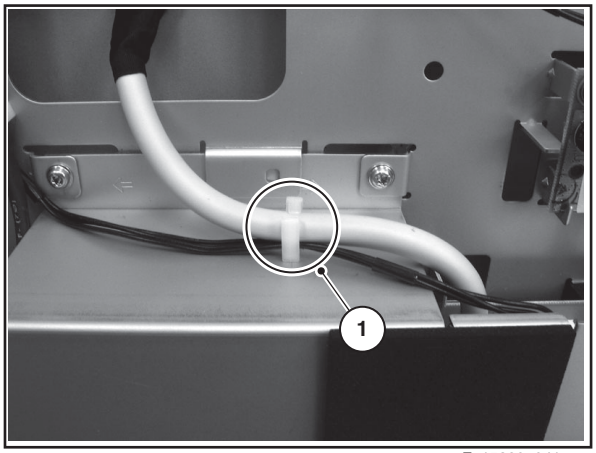

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Figure 4-6 Cable clip on cover shield - Photo A

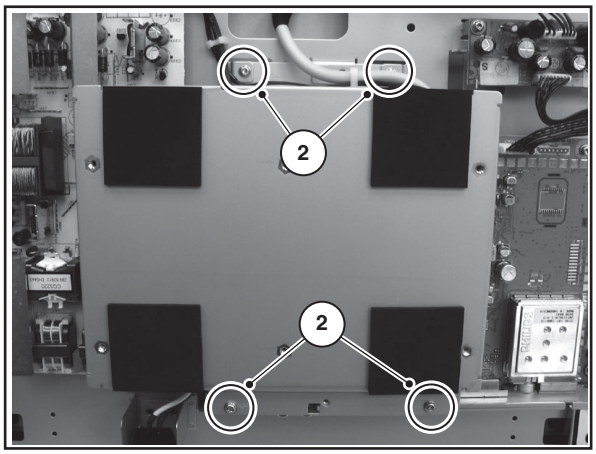

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Figure 4-7 Cover shield of TV & scaler board - Photo B

1. Release the two cables from the plastic cable clip (1) on the shield (see photo A above).
2. Remove the four fixation screws (2, indicated by arrows on the shield) and remove the shield; notice that on one side, the shield is not only held by two screws, but also by two brackets (see photo A above).

4.3.6 TV & Scaler Board

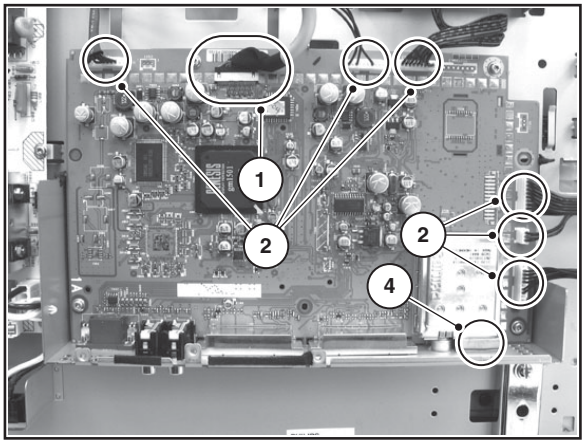

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Figure 4-8 Connectors on TV & scaler board - Photo A

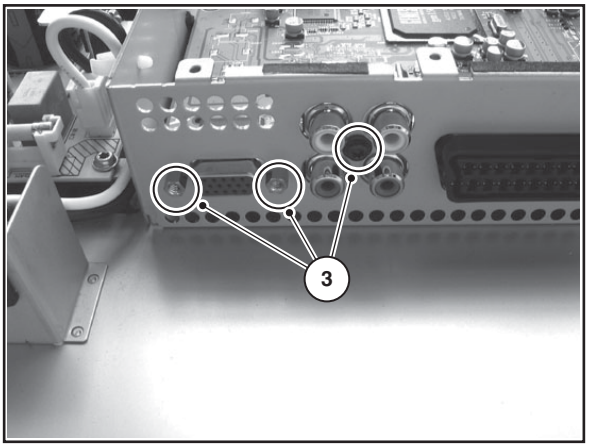

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Figure 4-9 Screws on VGA and audio connector - Photo B

1. Very **cautiously** disconnect the LVDS cable (1) from the panel (see Photo A). Notice that this cable is very fragile.
2. Disconnect the six remaining cables (2) from the panel.
3. Remove the three fixation screws (3) from the VGA connector and the audio connector on the TV & scaler board (see Photo B).
4. Take the panel out of its brackets.
5. Check if the foam/mesh connector block (4) is well attached to the tuner (see Photo A). The tuner should always have a good electrical contact with the antenna input side of the metal rear I/O connector plate.

4.3.7 Power Supply Panel

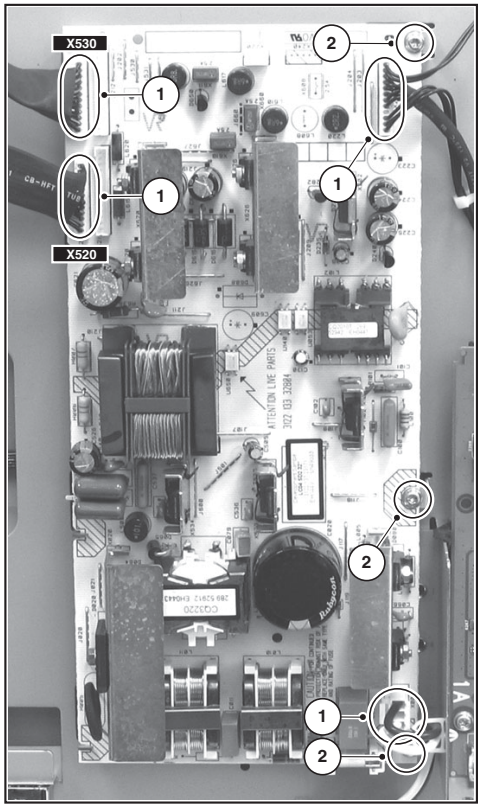

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Figure 4-10 Power supply panel

1. Disconnect all cables (1) from the panel. Notice that the two connectors for X520 and X530 on this panel are similar, and should not be mixed up later when they are reconnected (X520 is connected via its flatcable to connector 66B on the LCD panel, near the R-speaker; X530 is connected via its flatcable to connector 67B on the LCD panel, near the L-speaker).
2. Remove the three fixation screws (2) from the panel.
3. Take the panel out of its brackets.

4.3.8 Audio Panel

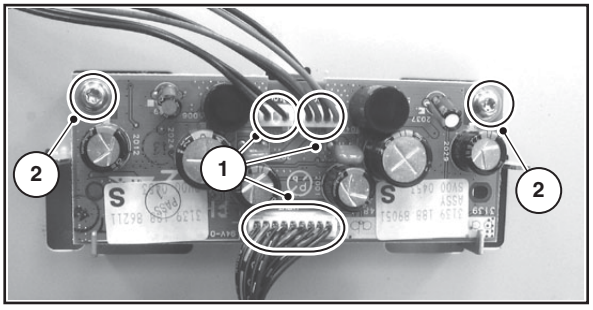

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Figure 4-11 Audio panel

1. Disconnect all cables (1) from the panel.
2. Remove the fixation screws (2) from the panel.
3. Remove the panel.

4.3.9 LCD Panel

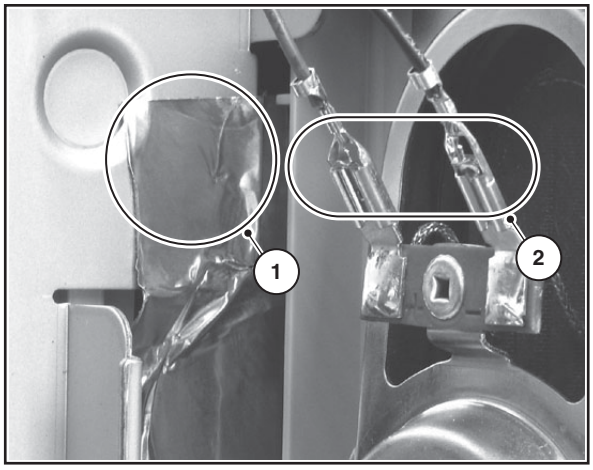

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Figure 4-12 Anti-static copper foil - Photo A

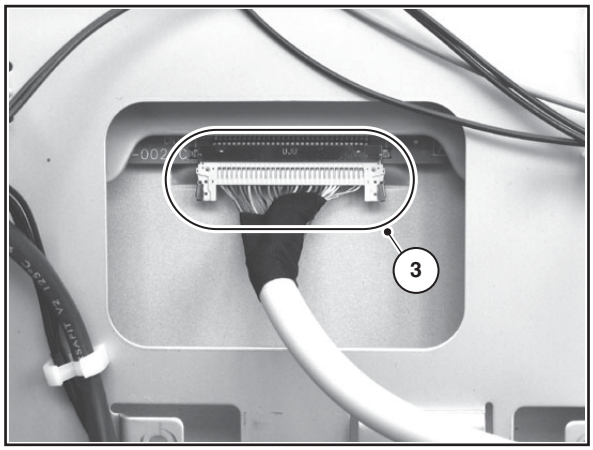

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Figure 4-13 LVDS connector - Photo B

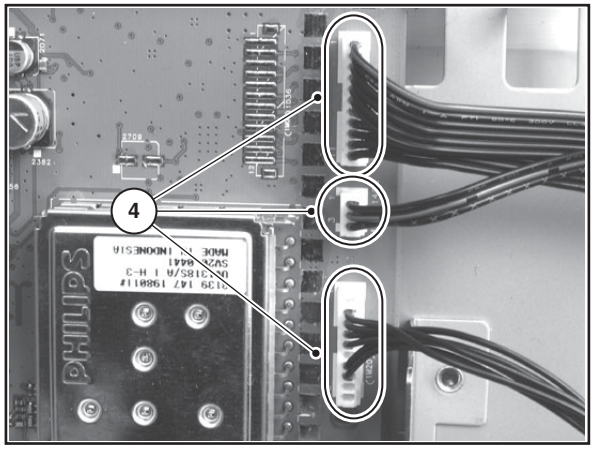

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Figure 4-14 Connectors for side I/O panel, keyboard control panel, and LED panel on TV & scaler board - Photo C

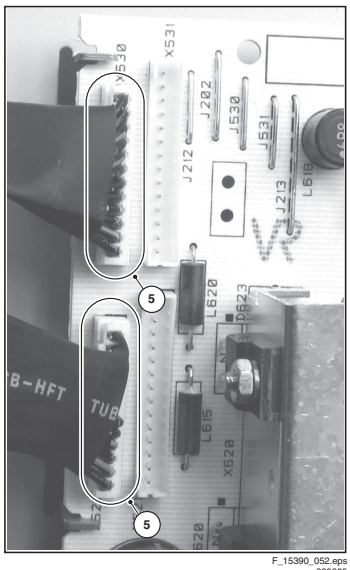

Figure 4-15 Connectors X520 and X530 on power supply panel - Photo D

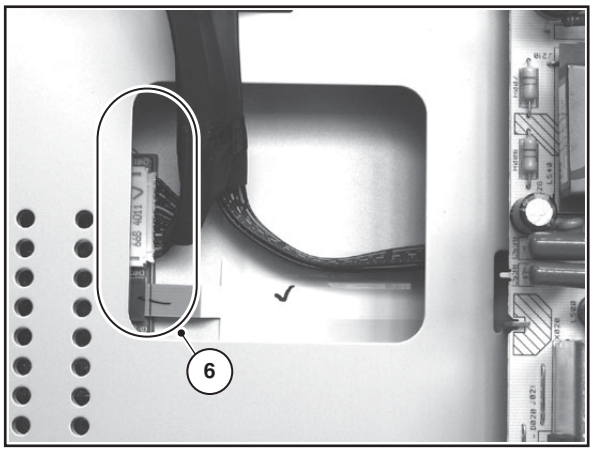

Figure 4-16 Connector 66B on LCD panel - Photo E

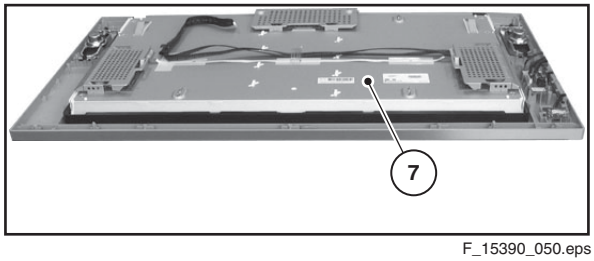

Figure 4-17 LCD panel, lying on its plastic frame - Photo F

1. Cautiously pull back the upper left part of the anti-static copper foil (see Photo A). Do this in such a way that the foil is no longer attached to the metal ground plate on which the TV & Scaler board is mounted.
2. Disconnect the cables (2) of the “L” and the “R” loudspeakers (see Photo A).
3. **Important:** Unplug the LVDS connector (3) on the LCD panel (see Photo B).
   Be careful, as this is a very fragile connector!
4. Unplug the connectors (4) of the Side I/O panel, the Top Control panel, and the LED panel on the TV & Scaler board (see Photo C).
5. Unplug the X520 and X530 connectors (5) on the Power Supply board (see Photo D). Instead of X520, also connector 66B (6) on the other end of the flatcable can be unplugged (see Photo E).
6. Lift the metal frame (together with all PWBs) from the LCD panel. **Take care not to damage the fragile LVDS cable, the 66B connector and the anti-static copper foil near the “L” loudspeaker (take care of this too when later re-assembling the TV set and replacing the copper foil).**
7. After removal of the metal frame, you can lift the LCD display (7) from its plastic frame (see Photo F).
8. If the plastic frame is damaged, replace it by a new frame, after removing the loudspeakers, the Side I/O panel, the Top Control panel, and the LED panel.

4.4 Set Re-assembly

To re-assemble the whole set, execute all processes in reverse order.

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original positions. See figure "Cable dressing". Also make sure that the anti-static copper foil is not damaged and that it makes good electrical contact with the metal frame. Be careful with the fragile LVDS cable.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

5.1 Test Points

This chassis is equipped with test points in the service printing. In the schematics test points are identified with a rectangle box around Fxxx or Ixxx. These test points are specifically mentioned in the service manual as “half moons” with a dot in the centre.
Perform measurements under the following conditions:

- Television set in Service Default Alignment Mode.
- Video input: colour bar signal.
- Audio input: 3 kHz left channel, 1 kHz right channel.

5.2 Service Modes

Service Default mode (SDM) and Service Alignment Mode (SAM) offers several features for the service technician, while the Customer Service Mode (CSM) is used for communication between the call centre and the customer.

This chassis also offers the option of using ComPair, a hardware interface between a computer and the TV chassis. It offers the abilities of structured troubleshooting, error code reading, and software version read-out for all chassis.
Minimum requirements for ComPair: a Pentium processor, a Windows OS, and a CD-ROM drive (see also paragraph "ComPair").

5.2.1 Service Default Mode (SDM)

Purpose

- To create a predefined setting for measurements.
- To override software protections.
- To start the blinking LED procedure.
- To inspect the error buffer.
- To check the life timer.

Specifications

Table 5-1 SDM default settings

Region	Freq. (MHz)	Default system
Europe, AP-PAL/Multi	475.25	PAL B/G
NAFTA, AP-NTSC, LATAM	61.25 (ch. 3)	NTSC M

- All picture settings at 50% (brightness, colour contrast, hue).
- Bass, treble and balance at 50%; volume at 25%.
- All service-unfriendly modes (if present) are disabled. The service unfriendly modes are:
  - Timer / Sleep timer.
  - Child / parental lock.
  - Blue mute.
  - Hotel / hospital mode.
  - Auto shut off (when no “IDENT” video signal is received for 15 minutes).
  - Skipping of non-favourite presets / channels.
  - Auto-storage of personal presets.
  - Auto user menu time-out.
  - Auto Volume Levelling (AVL).

How to Enter

To enter SDM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: **“062596”** directly followed by the MENU button (do not allow the OSD display to time out between entries while keying the sequence).
- Short SDM jumper (item 4022, see Figure "Service jumper") on the **bottom side (solder side)** of the TV & Scaler board and apply AC Power. Remove the jumper after start-up.
  Caution: Entering SDM by shorting "Service" jumpers will override the software protections. Do this only for a short period. **When doing this, the service-technician must know exactly what he is doing, as it could damage the television set**.

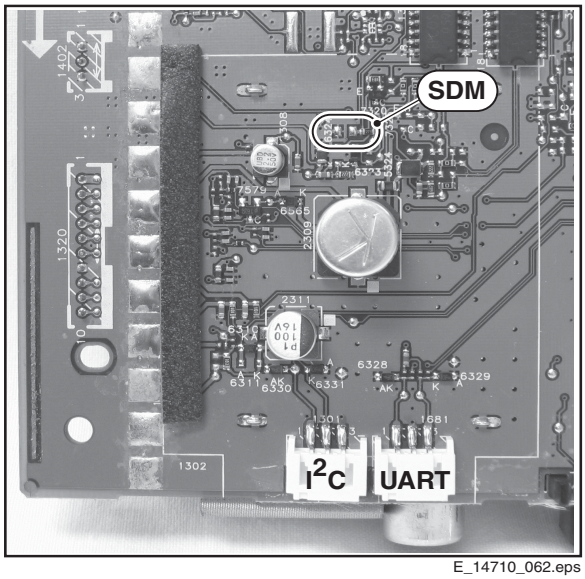

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Figure 5-1 SDM service jumper (on rear side of board)

After entering SDM, the following screen is visible, with SDM in the upper right corner of the screen to indicate that the television is in Service Default Mode.

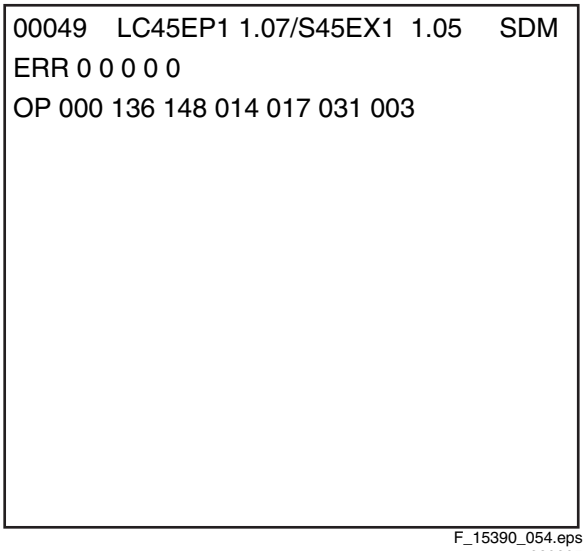

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Figure 5-2 SDM menu (example)

How to Navigate
When you press the MENU button on the remote control, the set will switch on the normal user menu in the SDM mode.

How to Exit
Switch the set to STANDBY by pressing the POWER button on the remote control transmitter.
If you turn the television set off by removing the mains (i.e., unplugging the television) or by using the POWER button on the TV set, the television set will remain in SDM when mains is re-applied, and the error buffer is not cleared.

5.2.2 Service Alignment Mode (SAM)

Purpose
- To change option settings.
- To display / clear the error code buffer.
- To perform alignments.

Specifications
- Operation hours counter (maximum five digits displayed).
- Software version, Error codes, and Option settings display.
- Error buffer clearing.
- Option settings.
- Software alignments (Tuner, White Tone, Geometry, and Audio).
- NVM Editor.
- ComPair Mode switching.

How to Enter
Press the following key sequence on the remote control transmitter: **"062596"** directly followed by the OSD/STATUS/INFO button (do not allow the OSD display to time out between entries while keying the sequence).

After entering SAM, the following screen is visible, with SAM in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.

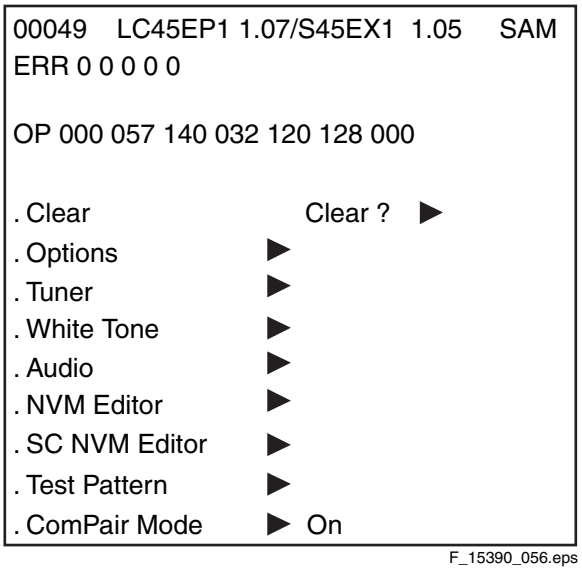

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Figure 5-3 SAM menu (example)

Menu Explanation
1. **LLLLL.** This represents the run timer. The run timer counts normal operation hours (including "on/off" switching), but does not count stand-by hours.
2. **AAAABCD-X.YY/EEEEEE_F.GG.** This is the software identification of the Main/Scaler microprocessor:
   - **A**= the chassis name.
   - **B**= the region: E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM.
   - **C**= the software diversity:
     - **Europe:** T= 1 pg TXT, F= Full TXT, V= Voice ctrl.
     - **LATAM and NAFTA:** N= Stereo non-dBx, S= Stereo dBx.
     - **Asian Pacific:** T= TXT, N= non-TXT, C= NTSC.
     - **ALL regions:** M= mono, D= DVD, P= Pixel Plus, Q= Mk2.
   - **D**= the language cluster number.
   - **X**= the Main software version number (updated with a major change that is incompatible with previous versions).
   - **YY**= the sub software version number (updated with a minor change that is compatible with previous versions).
   - **EEEEEE**= the Scaler SW cluster
   - **F**= the Scaler SW version no.
   - **GG**= the sub-version no.
3. **SAM.** Indication of the Service Alignment Mode.
4. **Error Buffer (ERR).** Shows all errors detected since the last time the buffer was erased. Five errors possible.
5. **Option Bytes (OP).** Shows all option settings. See "Options" in the Alignments section for a detailed description. Seven codes are available.
6. **Clear.** Erases the contents of the error buffer. Select the CLEAR menu item and press the CURSOR RIGHT key. The content of the error buffer is cleared.
7. **Options.** Used to set the option bits. See "Options" in the Alignments section for a detailed description.
8. **Tuner.** Used to align the tuner. See "Tuner" in the Alignments section for a detailed description.
9. **White Tone.** Used to align the white tone. See "White Tone" in the Alignments section for a detailed description.
10. **Audio.** No audio alignment is necessary for this television set.
11. **NVM Editor.** Can be used to change the NVM data in the television set.
12. **SC NVM Editor. Can be used to edit Scaler NVM.**
13. **Test Pattern.** For future use.
14. **ComPalr.** Can be used to switch the television to "In System Programming" (ISP) mode, for software uploading via ComPair.
    Caution: When this mode is selected without ComPair connected, the TV will be blocked. Remove the AC power to reset the TV.

How to Navigate
- In SAM, select menu items with the CURSOR UP/DOWN keys on the remote control transmitter. The selected item will be highlighted. When not all menu items fit on the screen, use the CURSOR UP/DOWN keys to display the next / previous menu items.
- With the CURSOR LEFT/RIGHT keys, it is possible to:
  - Activate the selected menu item.
  - Change the value of the selected menu item.
  - Activate the selected submenu.
- In SAM, when you press the MENU button twice, the set will switch to the normal user menus (with the SAM mode still active in the background). To return to the SAM menu press the MENU button again.
- When you press the MENU key in while in a submenu, you will return to the previous menu.

How to Store SAM Settings
To store the settings changed in SAM mode, leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set.

How to Exit
Switch the set to STANDBY by pressing the POWER button on the remote control transmitter or on the television set.

5.2.3 Customer Service Mode (CSM)

Purpose
The Customer Service Mode shows error codes and information on the TV's operation settings. The call centre can instruct the customer (by telephone) to enter CSM in order to identify the status of the set. This helps the call centre to diagnose problems and failures in the TV set before making a service call.
The CSM is a read-only mode; therefore, modifications are not possible in this mode.

How to Enter
To enter CSM, press the following key sequence on the remote control transmitter: **"123654"** (do not allow the OSD display to time out between entries while keying the sequence).

Upon entering the Customer Service Mode, the following screen will appear:

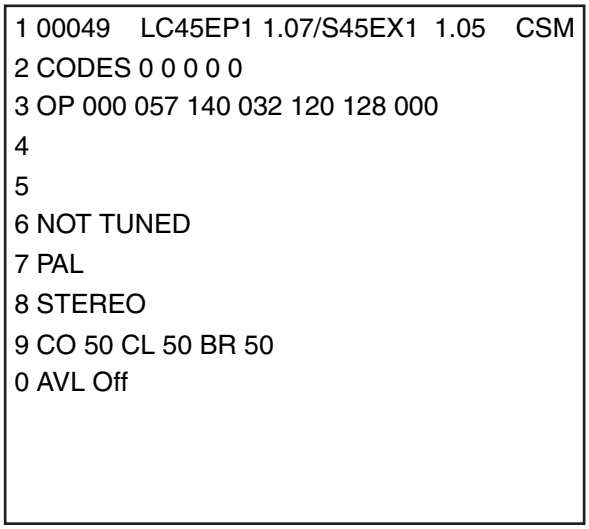

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Figure 5-4 CSM menu (example)

Menu Explanation
1. Indication of the decimal value of the operation hours counter, Main/Scaler software version (see "Service Alignment Mode" for an explanation), and service mode (CSM= Customer Service Mode).
2. Displays the last five errors detected in the error code buffer.
3. Displays the option bytes.
4. Displays the type number version of the set (option).
5. Reserved.
6. Indicates the television is receiving an "IDENT" signal on the selected source. If no "IDENT" signal is detected, the display will read "NOT TUNED"
7. Displays the detected Colour system (e.g. PAL/NTSC).
8. Displays the detected Audio (e.g. stereo/mono).
9. Displays the picture setting information.
10. Displays the sound setting information.

How to Exit
To exit CSM, use one of the following methods:
- Press the MENU, STATUS (or EXIT/INFO/[i+]), or POWER button on the remote control transmitter.
- Press the POWER button on the television set.

5.3 Problems and Solving Tips Related to CSM

5.3.1 Picture Problems

Note: The problems described below are all related to the TV settings. The procedures used to change the value (or status) of the different settings are described.

Picture too Dark or too Bright

If:
- The picture improves when you press the AUTO PICTURE button on the remote control transmitter, or
- The picture improves when you enter the Customer Service Mode,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the CURSOR UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the CURSOR LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the CURSOR UP/DOWN keys (if necessary) to select BRIGHTNESS.
6. Press the CURSOR LEFT/RIGHT keys to increase or decrease the BRIGHTNESS value.
7. Use the CURSOR UP/DOWN keys to select PICTURE.
8. Press the CURSOR LEFT/RIGHT keys to increase or decrease the PICTURE value.
9. Press the MENU button on the remote control transmitter twice to exit the user menu.
10. The new PERSONAL preference values are automatically stored.

White Line around Picture Elements and Text

If:
The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the CURSOR UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the CURSOR LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the CURSOR UP/DOWN keys to select SHARPNESS.
6. Press the CURSOR LEFT key to decrease the SHARPNESS value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

Snowy Picture
Check CSM line 6. If this line reads "Not Tuned", check the following:
- Antenna not connected. Connect the antenna.
- No antenna signal or bad antenna signal. Connect a proper antenna signal.
- The tuner is faulty (in this case line 2, the Error Buffer line, will contain error number 10). Check the tuner and replace/ repair the tuner if necessary.

Black and White Picture

If:
- The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the CURSOR UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the CURSOR LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the CURSOR UP/DOWN keys to select COLOUR.
6. Press the CURSOR RIGHT key to increase the COLOUR value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

Menu Text not Sharp Enough

If:
- The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the CURSOR UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the CURSOR LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the CURSOR UP/DOWN keys to select PICTURE.
6. Press the CURSOR LEFT key to decrease the PICTURE value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

5.4 ComPair

5.4.1 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the European DST (service remote control), which allows faster and more accurate diagnostics. ComPair has three big advantages:
- ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
- ComPair allows very detailed diagnostics (on I^2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I^2C commands yourself because ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the Force/SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

5.4.2 Specifications

ComPair consists of a Windows based fault finding program and an interface box between a PC and the (defective) product. The ComPair interface box is connected to the PC via a serial (or RS232) cable.
For this chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector(s).

The ComPair fault finding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in two ways:
- Automatic (by communication with the television): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I^2C/UART level. ComPair can access the I^2C/UART bus of the television. ComPair can send and receive I^2C/UART commands to/from the micro controller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I^2C/UART buses of the TV-set.
- Manually (by asking questions to you): Automatic diagnosis is only possible if the micro controller of the television is working correctly, and only to a certain extent. When this is not the case, ComPair will guide you through the fault finding tree by asking you questions (e.g. *Does the screen give a picture? Click on the correct answer: YES / NO*) and showing you examples (e.g. *Measure test-point I7 and click on the correct oscillogram you see on the oscilloscope*). You can answer by clicking on a link (e.g. text or a waveform picture) that will bring you to the next step in the fault finding process.

By a combination of automatic diagnostics and an interactive question / answer procedure, ComPair will enable you to find most problems in a fast and effective way.

Beside fault finding, ComPair provides some **additional features** like:
- Up- or downloading of pre-sets.
- Managing of pre-set lists.
- Emulation of the (European) Dealer Service Tool (DST).
- If both ComPair and Force/SearchMan (Electronic Service Manual) are installed, all the schematics and the PWBs of the set are available by clicking on the appropriate hyperlink.
  Example: *Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Mono-carrier.*
  – Click on the “Panel” hyperlink to automatically show the PWB with a highlighted capacitor C2568.
  – Click on the “Schematic” hyperlink to automatically show the position of the highlighted capacitor.

5.4.3 How to Connect

This is described in the chassis fault finding database in ComPair.

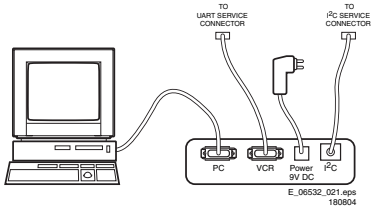


Figure 5-5 ComPair interface connection

5.4.4 How to Order

ComPair order codes (EU/AP/LATAM):
- Starter kit ComPair32/SearchMan32 software and ComPair interface (excl. transformer): 3122 785 90450.

- ComPair interface (excluding transformer): 4822 727 21631.
- Starter kit ComPair32 software (registration version): 3122 785 60040.
- Starter kit SearchMan32 software: 3122 785 60050.
- ComPair32 CD (update): 3122 785 60070 (year 2002), 3122 785 60110 (year 2003 onwards).
- SearchMan32 CD (update): 3122 785 60080 (year 2002), 3122 785 60120 (year 2003), 3122 785 60130 (year 2004).
- ComPair firmware upgrade IC: 3122 785 90510.
- Transformer (non-UK): 4822 727 21632.
- Transformer UK: 4822 727 21633.
- ComPair interface cable: 3122 785 90004.
- ComPair interface extension cable: 3139 131 03791.
- ComPair UART interface cable: 3122 785 90630

Note: If you encounter any problems, contact your local support desk.

5.5 Error Codes

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from the left to the right. When an error occurs that is not yet in the error code buffer, it is displayed on the left side and all other errors shift one position to the right.

5.5.1 How to Read the Error Buffer

You can read the error buffer in 3 ways:
- On screen via the SAM (if you have a picture). Examples:
  - ERROR: 0 0 0 0 0: No errors detected
  - ERROR: 6 0 0 0 0: Error code 6 is the last and only detected error
  - ERROR: 9 6 0 0 0: Error code 6 was detected first and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See “The Blinking LED Procedure”.
- Via ComPair.

5.5.2 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:
- By using the CLEAR command in the SAM menu:
  - To enter SAM, press the following key sequence on the remote control transmitter: **“062596”** directly followed by the OSD/STATUS button (do not allow the OSD display to time out between entries while keying the sequence).
  - Make sure the menu item CLEAR is highlighted. Use the CURSOR UP/DOWN buttons, if necessary.
  - Press the CURSOR RIGHT button to clear the error buffer. The text on the right side of the “CLEAR” line will change from “CLEAR?” to “CLEARED”
- If an error does not re-occur within 50 hours it is deleted from the error buffer.

5.5.3 Error Codes

In case of non-intermittent faults, write down the errors present in the error buffer and clear the error buffer before you begin the repair. This ensures that old error codes are no longer present.
If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error and not the actual cause of the problem (for example, a fault in the protection detection circuitry can also lead to a protection).

Table 5-2 Error code overview

Error	Device	Error description	Check item	Diagram
0	Not applicable	-	-	-
1	Not applicable	-	-	-
2	Not applicable	-	-	-
3	Not applicable	-	-	-
4	GM1501 Scaler Flash-ROM	I^2C error while communicating with the Genesis Scaler and/or Flash-ROM is faulty/empty	7401 7530	A7 A11
5	Not applicable	+5V protection	7930	A6
6	I^2C bus	General I^2C error	7011, 3088, 3096	A2
7	Not applicable	-	-	-
8	M24C32	I^2C error while communicating with the Scaler EEPROM	7531	A11
9	M24C16	I^2C error while communicating with the EEPROM	7099	A2
10	Tuner	I^2C error while communicating with the PLL tuner	1302, 3302, 3303, 3327	A1
11	Not applicable	-	-	-
12	Not applicable	-	-	-
13	Not applicable	-	-	-
14	K4D263238M	Read-write error with the Scaler SDRAM	7501	A10
15	TDA9178T/N1	I^2C error while communicating with Histogram	7560	A3

5.6 The Blinking LED Procedure

Using this procedure, you can make the contents of the error buffer visible via the front LED. This is especially useful when there is no picture.

When the SDM is entered, the front LED will indicate (by blinking) the contents of the error-buffer:
- The LED blinks with as many pulses as the error code number, followed by a time period of 1.5 seconds, in which the LED is “off”.
- Then this sequence is repeated.

Any RC5 command terminates this sequence.

Example of error buffer: **12 9 6 0 0**
After entering SDM, the following occurs:
- 1 long blink of 5 seconds to start the sequence,
- 12 short blinks followed by a pause of 1.5 seconds,
- 9 short blinks followed by a pause of 1.5 seconds,
- 6 short blinks followed by a pause of 1.5 seconds,
- 1 long blink of 1.5 seconds to finish the sequence,
- The sequence starts again at 12 short blinks.

5.7 Fault Finding and Repair Tips

Notes:
- It is assumed that the components are mounted correctly, with correct values and with no bad solder joints.
- Before any fault finding actions, check if the correct options are set.

5.7.1 NVM Editor

In some cases, it can be handy if one directly can change the NVM contents. This can be done with the "NVM Editor" in SAM mode. With this option, single bytes can be changed.

Table 5-3 NVM editor overview

	Hex	Dec	Description
.ADR	0x000A	10	Existing value
.VAL	0x0000	0	New value
.Store	Store?		

5.7.2 Load Default NVM Values

In case a blank NVM is placed or when the NVM content is corrupted, default values can be downloaded into the NVM. After the default values are downloaded it will be possible to start up and to start aligning the TV set. This is no longer initiated automatically; to initiate the download the following action has to be performed:
1. Switch "off" the TV set via the AC Power switch.
2. Short circuit the SDM jumpers (keep short-circuited).
3. Press P+ or Ch+ on the local keyboard (and keep it pressed).
4. Switch on the TV set via the AC Power switch.
5. When the set has started, the P+/Ch+ button can be released and the short circuit of the SDM jumpers can be removed.
6. The red LED will be on continuously to indicate that the download is initiated (normally when SDM is activated the red LED will start with the Blinking LED sequence).
7. Wait +/- 30 s (time needed to download default values to the NVM).

5.7.3 Tuner and IF

No Picture in RF Mode
1. Check whether picture is present in AV. If not, go to Video processing troubleshooting section.
2. If present, check that the Option settings are correct.
3. Check that all supply voltages are present.
4. Check if I^2C lines are working correctly (3.3V).
5. Manually store a known channel and check if there is IF output at Tuner pin 11.
6. Feed in 105 dBuV at Tuner pin 11 and check whether there is RGB output from Video Processing IC. If yes, Tuner may be defect. Replace Tuner.

Required System is not Selected Correctly
1. Check whether a Service jumper (#4022, 0805 size) is present. If yes, remove it.

5.7.4 Video Processing

No Power
1. Check +12 V and 3V3 at position 1910.
2. If no supply, check the connector 1910.
3. If it is correct, check the power supply board.

Power Supply is Correct but no Green LED
1. Check if connectors 1005 and 1601 are properly inserted.
2. If yes, check if the 3V3 is present.

No Picture Display
1. Check the RGB signal.
2. If it is present, check 3-IC7016 (NE555).
3. If it has output, the problem is in SCALER part.
4. Otherwise, check H-out on pin 2 of NE555. If the input signal of pin 2 is present, but no output, the IC is defect.

Note:
- If the H-out (pin 67) doesn't have signal or the level is low, check the output of NE555 (pin 3) during start up.
- If the H-out (pin 67) has a signal (or has a signal for a very short time), change IC7016 (NE555).

No TV but PC is Present
1. Check if HSYNC and VSYNC are present at pin 3 of 7017 and 7015.
2. If they are present, check RGB output.
3. If there is no RGB output, the IC TDA120xx can be defect.

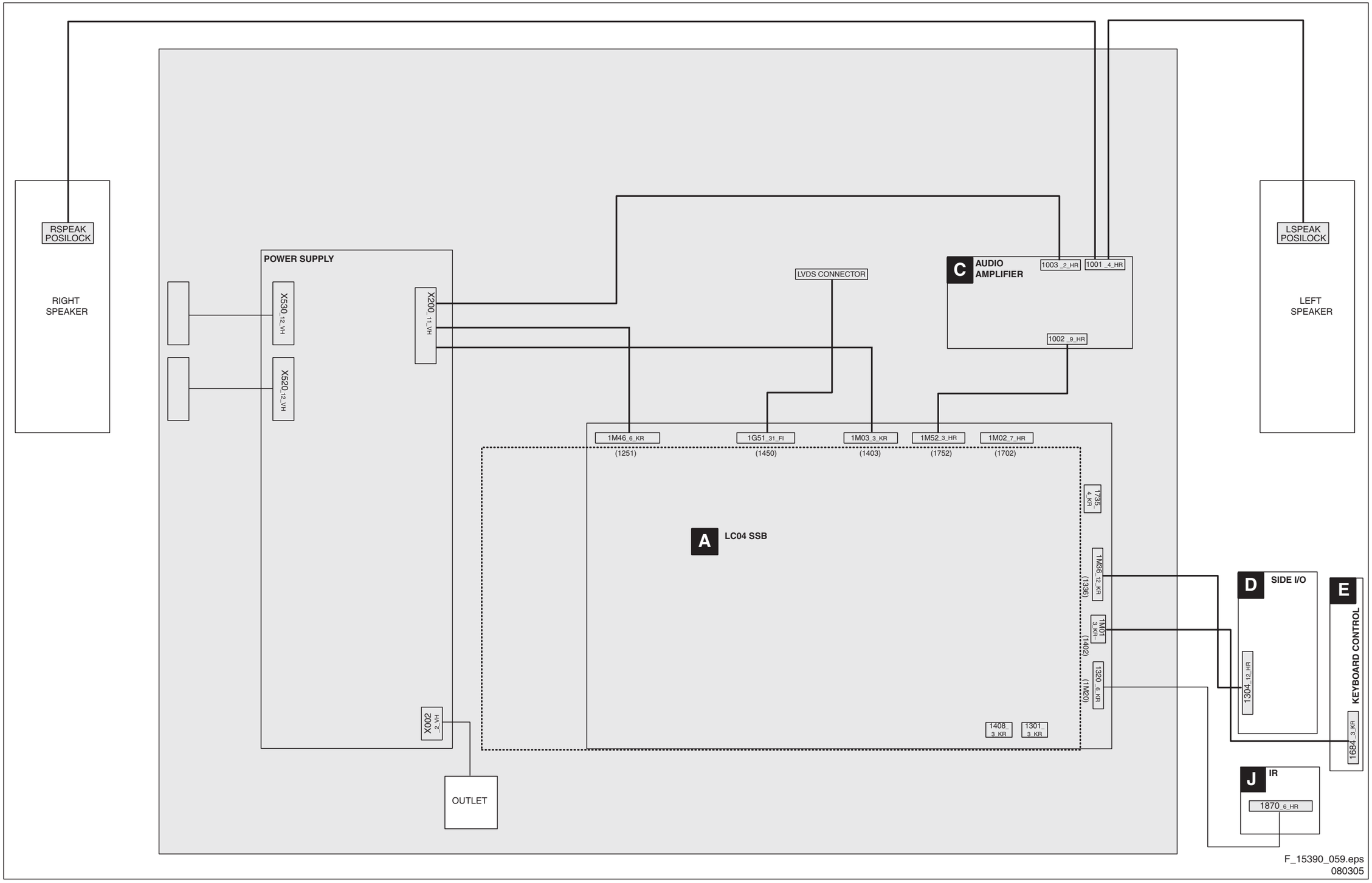
5.7.5 Power Supply

This power supply contains two fuses. One is near the AC Power (or mains) inlet connector 1308 and the other is near connector 1307.

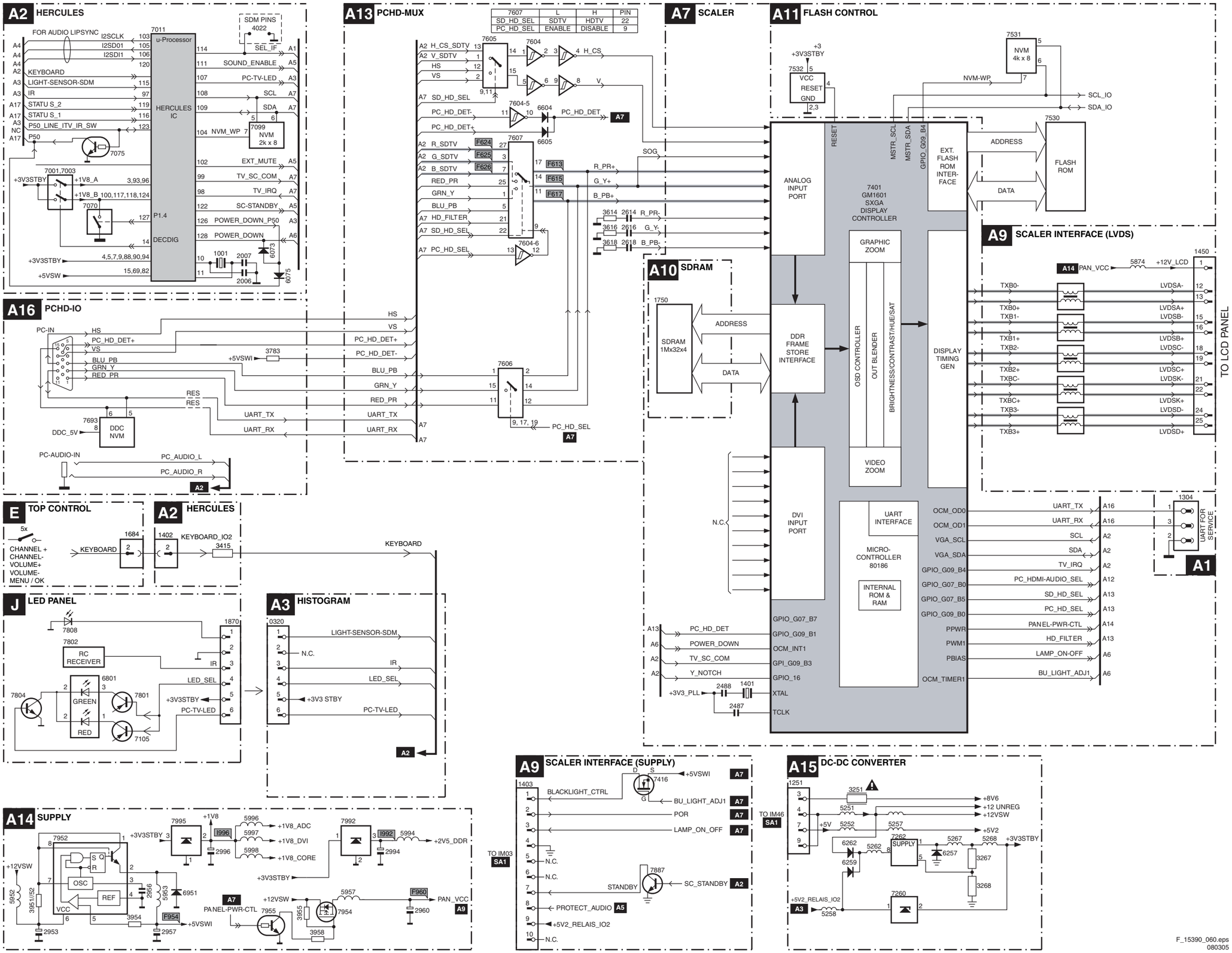
1. Check with power supply in "off" state by means of ohmic measurement.
2. Fuse 1400 may open in case of severe lightning strikes and/or failures in the power supply.
3. Fuses 1401 may open in case of a problem with the Stand-by Supply. Replacement of the fuse is needed, but not before the cause of the overload conditions has been resolved.

6. Block Diagrams, Testpoint Overviews, and Waveforms

Wiring Diagram



Block Diagram Video



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Block Diagram Audio + Video

SYSTEM	7011
PAL-MULTI/SECAM	TDA12021
NTSC	TDA12001
CHINA/NTSC-AP	TDA12011

A1 TUNER + VIF

A2 HERCULES

7011 - IF

A17 REAR IO SCART

SCART 2

SCART 1

A3 HISTOGRAM

A4 AUDIO DELAY LINE (LIPSYNC)

A5 AUDIO AMPLIFIER

A6 TV SUPPLY

C AUDIO AMPLIFIER

D SIDE I/O

A2 HERCULES

7011 - SOUND

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080305

Testpoint Overview SSB (Top Side)

F002	C3
F003	F2
F004	D5
F005	D5
F006	E5
F007	C4
F008	C3
F009	C3
F010	C3
F011	C3
F012	B3
F013	D4
F014	D4
F018	D5
F019	C5
F020	E4
F021	C5
F022	B4
F023	C4
F024	C2
F025	C2
F026	D1
F027	C1
F028	E3
F029	D4
F030	D4
F031	D4
F032	D4
F033	E5
F034	D4
F035	E5
F036	D5
F037	B3
F038	E5
F039	C2
F040	E5
F041	C4
F042	D5
F043	D4
F044	D5
F045	E5
F046	D4
F047	D4
F048	C1
F049	E4
F050	D5
F051	E4
F052	E4
F053	E4
F058	E5
F060	C5
F061	E5
F062	E5
F063	D5
F067	E5
F068	D5
F069	D5
F071	C5
F072	C1
F073	A5
F075	C4
F076	C4
F077	C1
F078	C1
F079	C1
F080	C1
F081	D1
F082	D1
F083	D1
F087	C3
F088	D3
F089	D3
F090	D4
F093	D2
F094	D5
F095	E5
F096	E5
F099	B4
F101	F4
F102	F6
F103	F3
F104	F6
F105	F4
F106	F4
F107	F3
F108	F6
F109	F4
F110	F7
F111	F4
F113	F4
F115	F5
F117	F5
F119	F5
F120	F5
F121	F5
F127	F6
F128	F6
F129	F6
F133	F6
F134	F7
F135	F7
F137	F7
F141	F7
F143	F8
F147	F9
F148	F8
F153	F9
F154	F7
F156	F9
F157	F7
F158	F7
F159	F7
F160	F7
F161	F4
F191	F7
F251	A10
F252	A10
F253	A9
F254	A10
F255	A10
F257	A9
F258	A8
F259	B6
F260	C10
F301	E4
F302	F2
F303	F2
F305	E3
F307	E2
F308	F2
F309	C4
F310	D3
F311	D3
F313	F2
F314	F3
F315	F3
F401	D6
F402	A7
F403	A7
F404	A7
F405	A7
F406	A7
F407	A7
F408	A7
F409	A7
F410	B7
F411	C10
F412	C10
F413	C10
F414	D10
F415	D10
F416	D10
F417	B7
F418	D10
F419	B9
F420	D1
F421	D1
F422	C5
F423	C5
F424	C5
F434	B7
F436	B7
F437	B7
F447	C7
F451	D7
F461	B8
F463	D7
F465	D6
F466	D6
F470	C7
F478	C8
F482	B7
F486	C7
F501	B9
F530	B6
F531	C7
F532	C7
F533	C7
F534	C6
F535	C6
F536	B6
F537	B6
F538	B6
F539	B6
F540	B6
F541	B7
F580	A4
F584	C4
F585	A4
F586	A4
F587	B4
F588	B4
F590	A3
F602	D7
F603	E7
F604	D6
F605	D6
F606	D7
F607	D6
F608	E7
F612	D7
F613	D7
F614	D6
F615	D7
F616	D6
F620	D6
F624	C6
F625	D6
F626	E6
F680	F9
F681	F10
F682	F10
F683	F10
F684	F10
F685	F10
F686	F10
F687	F10
F688	F10
F689	F10
F690	F10
F701	D2
F702	B3
F705	B2
F706	B2
F707	B2
F708	A2
F710	E4
F711	B2
F712	B2
F713	B2
F714	A2
F716	B3
F717	C3
F718	C3
F719	C2
F720	C2
F721	A2
F722	A2
F723	A3
F724	A3
F725	A3
F726	A3
F727	A3
F728	A4
F729	A2
F801	E9
F802	D9
F803	E8
F804	D9
F805	E8
F806	D7
F807	D7
F808	D8
F809	D9
F810	E8
F811	D8
F820	E9
F821	E9
F822	E9
F823	E9
F824	E9
F826	D8
F827	D8
F870	A7
F871	A7
F872	A8
F873	A7
F874	A7
F912	A4
F913	A5
F915	B4
F954	B7
F955	B8
F988	D7
I001	C5
I002	C3
I003	C3
I005	C4
I006	B3
I007	C3
I008	C5
I009	C3
I010	C3
I011	C3
I012	D3
I013	C5
I015	E2
I016	C5
I018	C3
I019	C3
I020	C3
I022	C3
I023	C5
I024	C5
I025	D4
I026	D4
I028	D4
I030	C4
I032	D4
I033	D4
I034	D4
I036	C5
I037	D4
I039	C5
I042	C5
I044	C5
I051	D5
I052	D5
I054	D5
I055	D5
I056	D5
I057	D5
I058	D5
I059	D4
I060	C3
I061	D5
I063	E4
I064	C5
I065	C5
I067	C4
I068	B4
I069	D5
I071	C5
I072	D5
I073	D4
I074	D4
I075	E2
I076	C5
I078	D5
I079	C5
I080	C5
I081	D5
I082	D5
I086	E1
I087	E1
I088	E1
I089	E1
I090	E1
I091	E1
I092	E1
I093	E1
I094	E1
I102	F4
I104	F4
I106	F4
I110	F3
I112	F4
I114	F5
I116	F5
I118	F5
I119	F5
I120	F5
I126	F6
I128	F6
I132	F6
I136	F7
I139	F7
I140	F7
I142	F7
I150	F4
I251	A10
I252	A9
I253	B10
I254	B10
I255	B10
I256	D10
I257	E10
I258	E10
I259	E10
I260	C10
I261	A10
I262	A10
I263	A10
I264	A10
I304	F2
I313	E3
I317	D3
I318	D3
I319	E2
I320	E2
I321	E3
I322	E3
I324	E3
I325	D3
I348	B4
I349	B4
I350	B5
I351	B4
I352	B5
I353	B5
I354	B5
I355	B5
I356	B5
I357	B5
I358	B5
I359	B5
I360	E2
I361	B5
I371	D4
I386	C5
I387	D5
I388	D3
I423	C7
I424	D7
I425	C7
I426	C6
I427	D8
I428	D8
I429	C8
I436	C8
I437	A6
I438	B7
I439	C6
I440	B6
I441	C6
I442	D7
I443	D7
I444	C8
I445	C8
I446	D7
I449	C6
I450	C6
I451	C6
I452	C6
I453	C6
I454	B6
I455	B6
I456	C6
I457	B6
I458	B7
I459	B7
I460	B7
I502	B9
I503	B9
I607	E6
I608	E6
I618	E7
I619	E7
I620	D6
I621	D7
I622	D7
I623	D7
I624	D7
I625	D7
I626	D7
I627	D6
I628	E6
I629	D7
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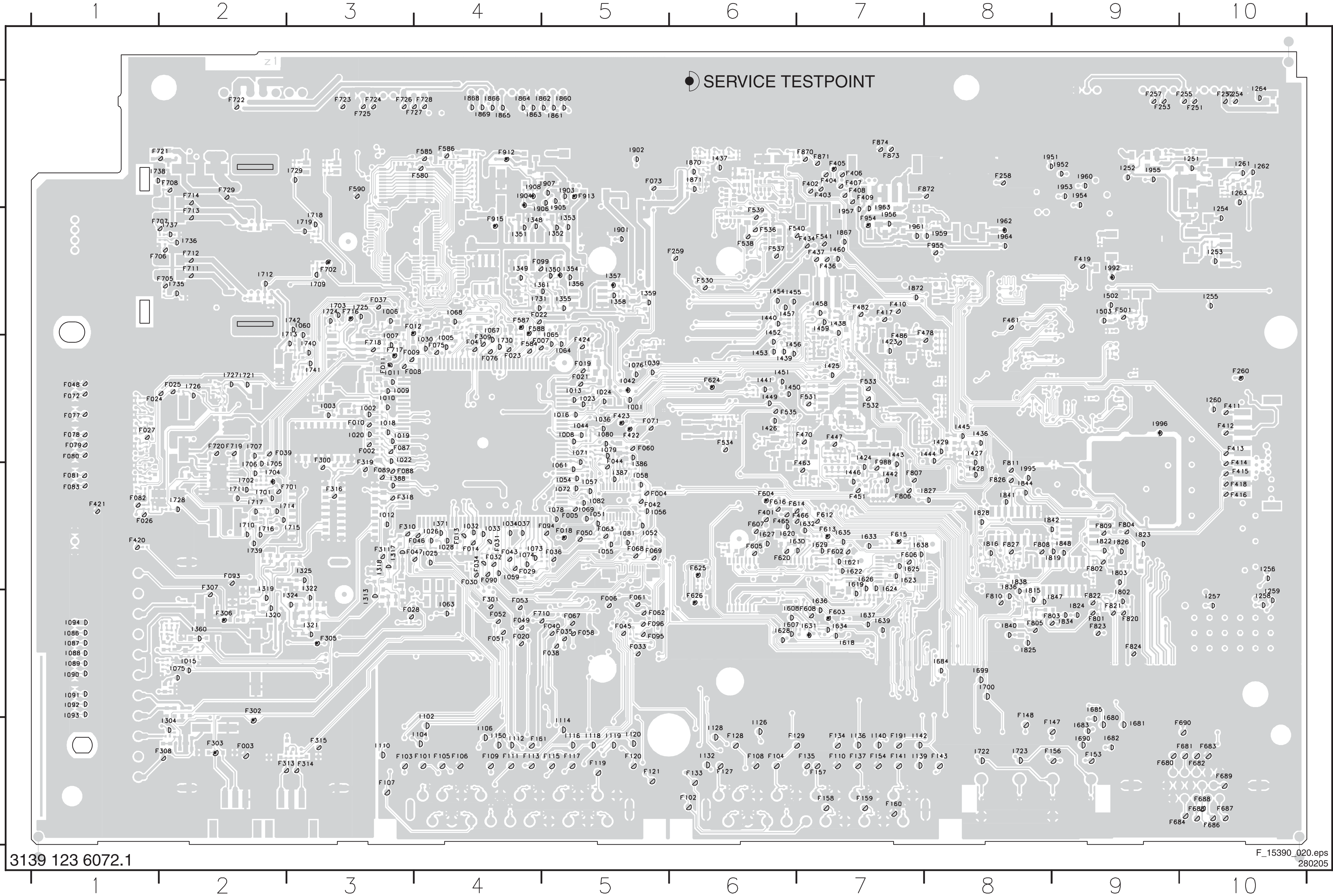
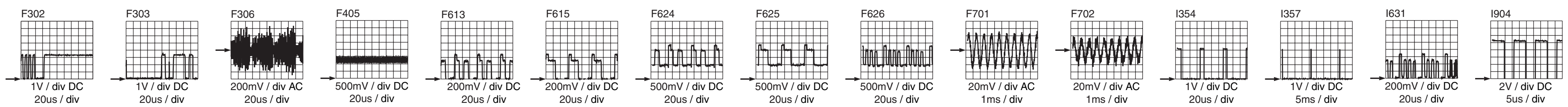
I631	E7
I632	D7
I633	D7
I634	E7
I635	D7
I636	E7
I637	E7
I638	D7
I639	E7
I680	F9
I681	F9
I682	F9
I683	F9
I684	E8
I685	F9
I690	F9
I699	E8
I700	E8
I701	D2
I702	D2
I703	B3
I704	D2
I705	D2
I706	D2
I707	C2
I709	B3
I710	D2
I711	D2
I712	B2
I713	C3
I714	D2
I715	D2
I716	D2
I717	D2
I718	B3
I719	B3
I721	C2
I722	F8
I723	F8
I724	B3
I725	B3
I726	C2
I727	C2
I728	D2
I729	A3
I730	C4
I731	B4
I735	B2
I736	B2
I737	B2
I738	A1
I739	D2
I740	C3
I741	C3
I742	B3
I802	E9
I803	D9
I815	E8
I816	D8
I819	D9
I822	D9
I823	D9
I824	E9
I825	E8
I826	D9
I827	D8
I828	D8
I834	E9
I836	E8
I838	E8
I840	E8
I841	D8
I842	D8
I844	D8
I847	E8
I848	D9
I860	A5
I861	A5
I862	A5
I863	A4
I864	A4
I865	A4
I866	A4
I867	B7
I868	A4
I869	A4
I870	A6
I871	A6
I872	B7
I901	B5
I902	A5
I903	A5
I904	A4
I905	A5
I906	A5
I907	A5
I908	A4
I951	A8
I952	A9
I953	A9
I954	A9
I955	A9
I956	B7
I957	B7
I959	B8
I960	A9
I961	B7
I962	B8
I963	B7
I964	B8
I992	B9
I995	D8
I996	C9

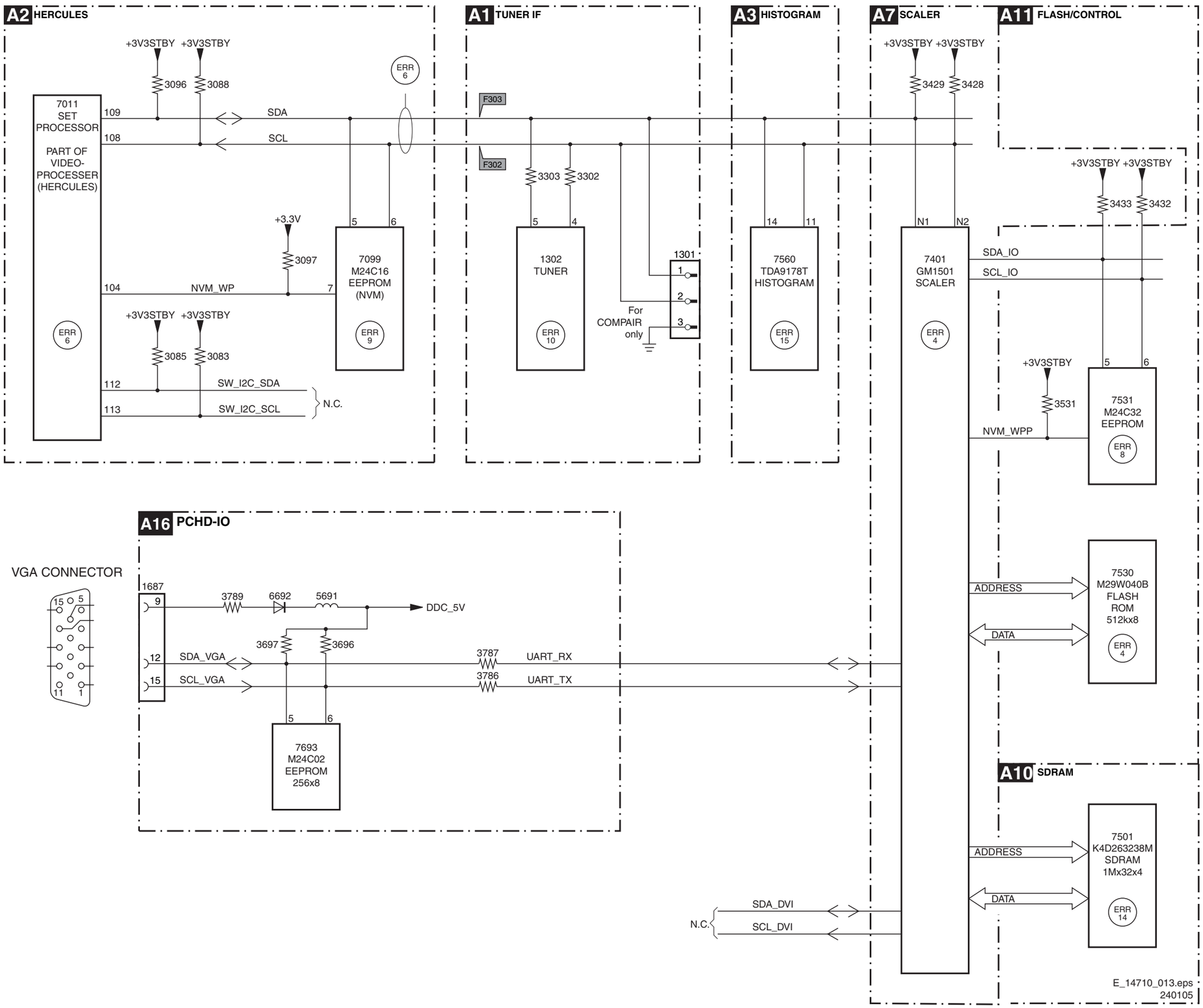




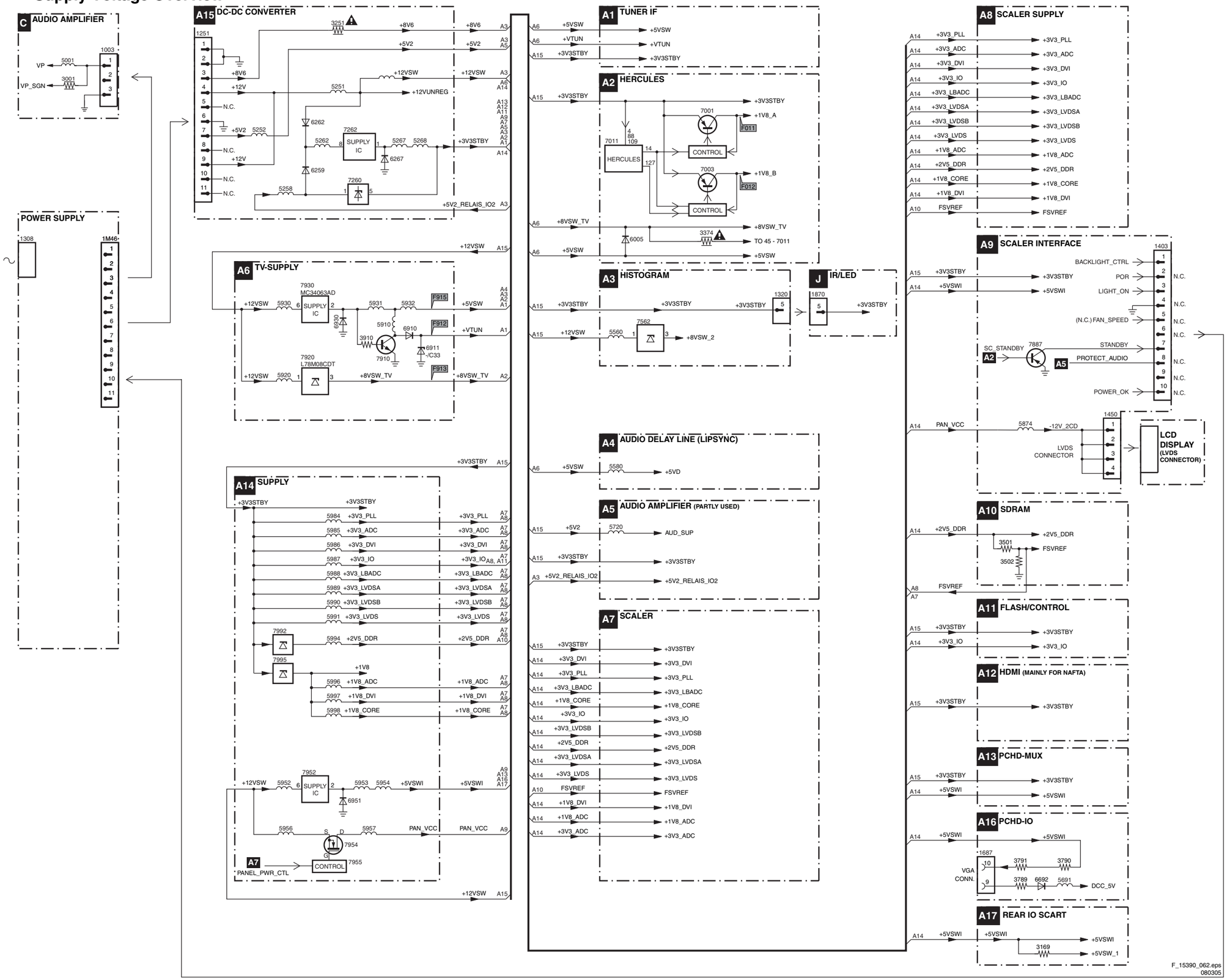
F011	1V9	F913	8V
F012	1V9	F958	11V6
F903	11V9	F960	11V4
F905	3V3	F954	5V4
F906	11V6	F992	2V5
F915	5V3	F996	1V8
F912	33V7		

I2C IC Overview

I2C BUS INTERCONNECTION DIAGRAM



Supply Voltage Overview



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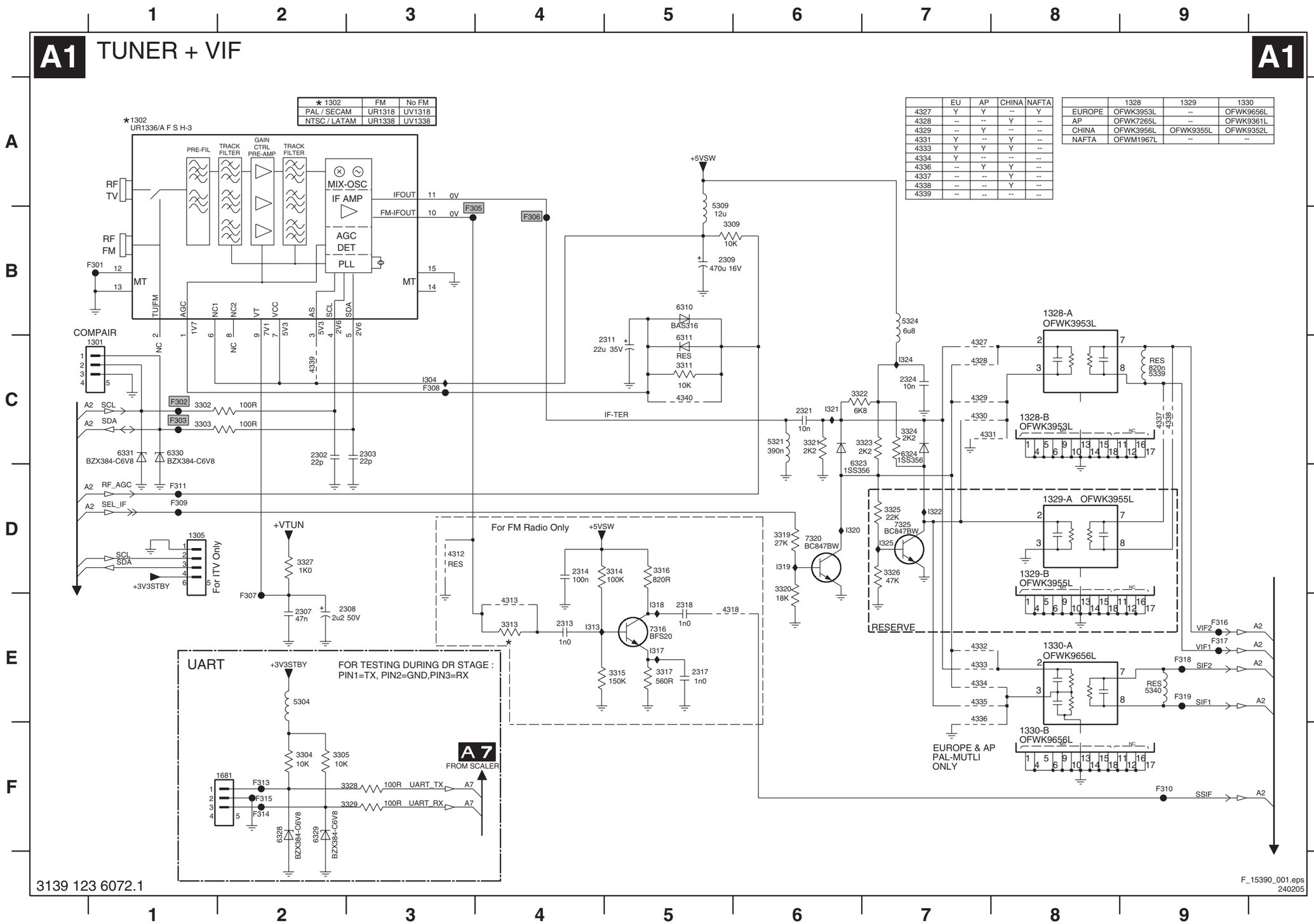
7. Circuit Diagrams and PWB Layouts

Tuner and VIF



★1302	FM	No FM
PAL / SECAM	UR1318	UV1318
NTSC / LATAM	UR1338	UV1338

	EU	AP	CHINA	NAFTA
4327	Y	Y	--	Y
4328	--	--	Y	--
4329	--	Y	--	--
4331	Y	--	Y	--
4333	Y	Y	Y	--
4334	Y	--	--	--
4336	--	Y	Y	--
4337	--	--	Y	--
4338	--	--	Y	--
4339	--	--	--	--

	1328	1329	1330
EUROPE	OFWK3953L	--	OFWK9656L
AP	OFWK7265L	--	OFWK9361L
CHINA	OFWK3956L	OFWK9355L	OFWK9352L
NAFTA	OFWM1967L	--	--

Histogram and Hercules

A2 HISTOGRAM & HERCULES

A2

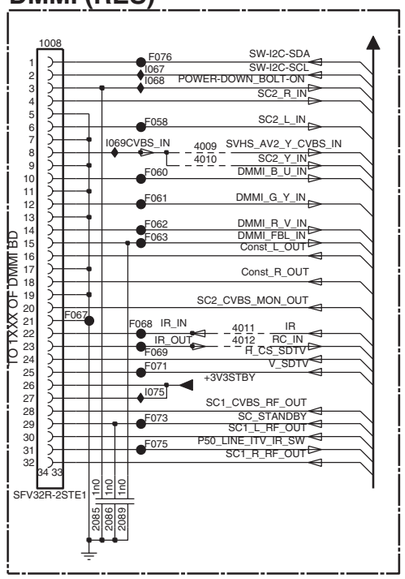
Item	No 3D	3D
4004	-	Yes
4005	Yes	-
4006	-	Yes
4007	Yes	-
4002	Yes	-
3009	Yes	-
2083	-	Yes

*	HETV (15W)	MTV (5W)
3380	5K6	10K
3381	5K6	10K
3382	5K6	10K
3383	5K6	10K

Histogram and Hercules

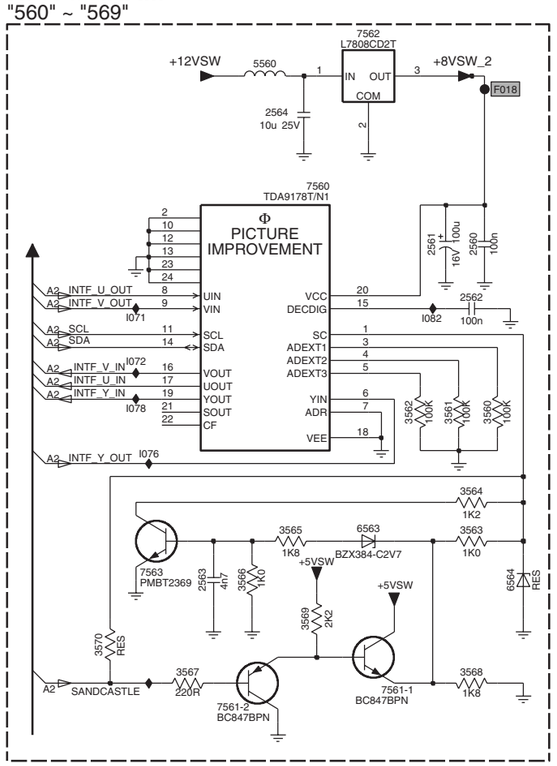
A3 HISTOGRAM & HERCULES

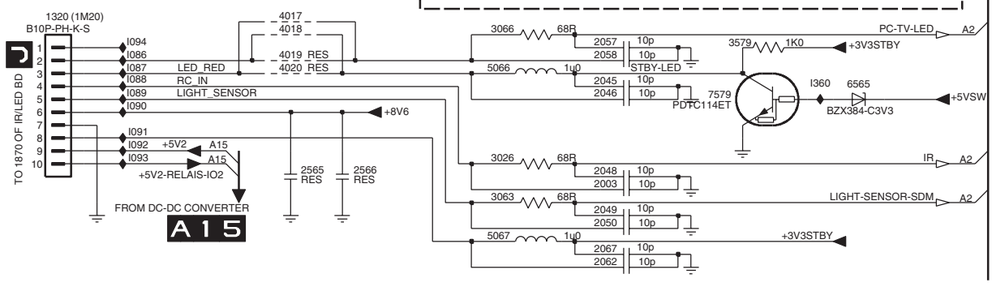
DMMI (RES)



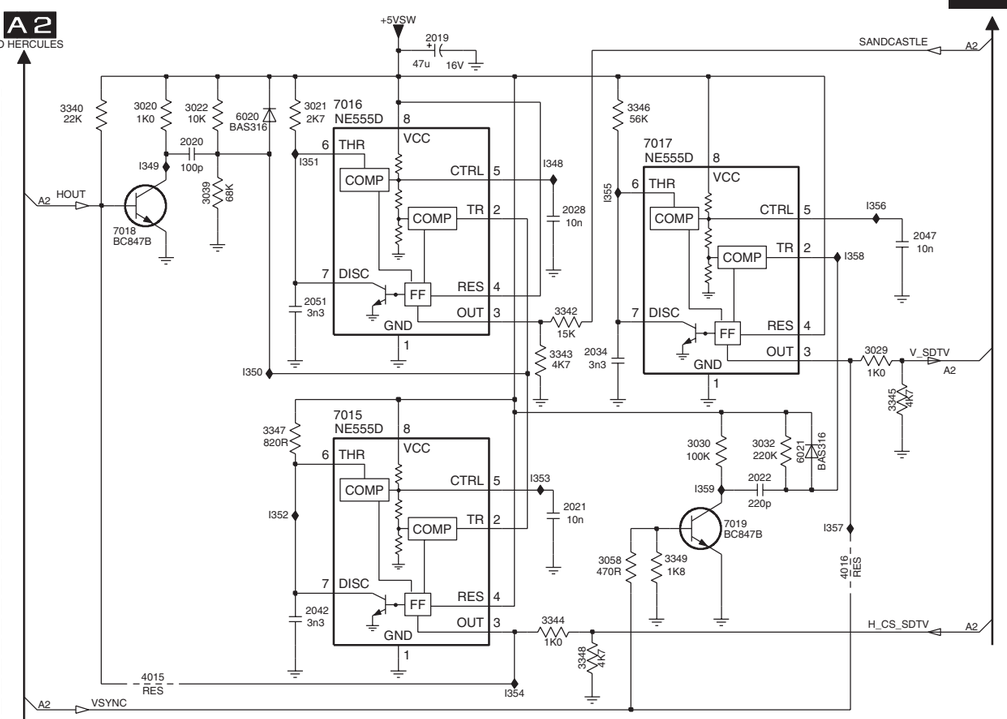
HISTOGRAM

"560" ~ "569"





A2 TO HERCULES



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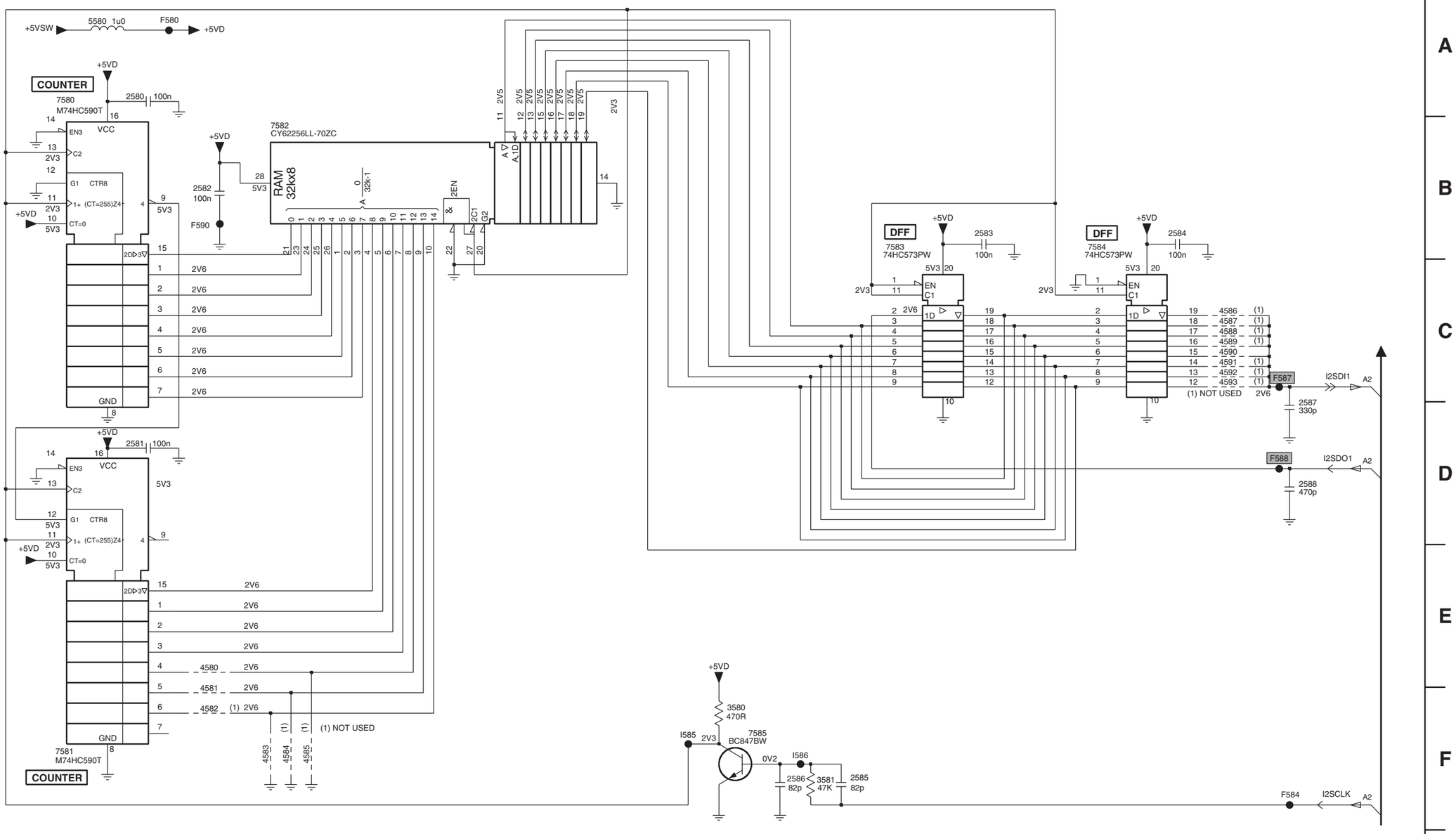
1008 A1	7015 C8
1320 E1	7016 A8
2003 F4	7017 A9
2019 A8	7018 B7
2020 A7	7019 C10
2021 C9	7560 B5
2022 C10	7561-1 E5
2028 B9	7561-2 E4
2034 B9	7562 A5
2042 D8	7563 D4
2045 E4	7579 F5
2046 F4	F018 A6
2047 B11	F058 B1
2048 F4	F060 B1
2049 F4	F061 B1
2050 F4	F062 B1
2051 B8	F063 B1
2057 E4	F067 C1
2058 E4	F068 C1
2062 F4	F069 C1
2067 F4	F071 C1
2085 D1	F073 C1
2086 D1	F075 C1
2089 D1	F076 A2
2560 B6	I067 A1
2561 B5	I068 A1
2562 B5	I069 B1
2563 D4	I071 C4
2564 A4	I072 C4
2565 F2	I075 C1
2566 F3	I076 C4
3020 A7	I078 C4
3021 A8	I082 C5
3022 A7	I086 E1
3026 F3	I087 E1
3029 B11	I088 E1
3030 C10	I089 E1
3032 C10	I090 F1
3039 B7	I091 F1
3058 D9	I092 F1
3063 F3	I093 F1
3066 E3	I094 E1
3340 A6	I348 A9
3342 B9	I349 A7
3343 B9	I350 C7
3344 D9	I351 A8
3345 C11	I352 C7
3346 A9	I353 C9
3347 C7	I354 D9
3348 D9	I355 B9
3349 D10	I356 B11
3560 C6	I357 C11
3561 C5	I358 B11
3562 C5	I359 C10
3563 D5	I360 E5
3564 D5	
3565 D4	
3566 D4	
3567 E4	
3568 E5	
3569 D5	
3570 D3	
3579 E5	
4009 B2	
4010 B2	
4011 C2	
4012 C2	
4015 D7	
4016 D11	
4017 E2	
4018 E2	
4019 E2	
4020 E2	
5066 E3	
5067 F3	
5560 A4	
6020 A7	
6021 C10	
6563 D5	
6564 D6	
6565 E5	

Audio Delay Line (Lip Sync)

A4 AUDIO DELAY LINE (LIPSYNC)



2580 A2
2581 D2
2582 B2
2583 B8
2584 B9
2585 F7
2586 F6
2587 C10
2588 D10
3580 F6
3581 F6
4580 E2
4581 F2
4582 F2
4583 F3
4584 F3
4585 F3
4586 C9
4587 C9
4588 C9
4589 C9
4590 C9
4591 C9
4592 C9
4593 C9
5580 A1
7580 A1
7581 F1
7582 B3
7583 B7
7584 B8
7585 F6
F580 A2
F584 F10
F587 C10
F588 D10
F590 B2
I585 F5
I586 F6

3139 123 6072.1

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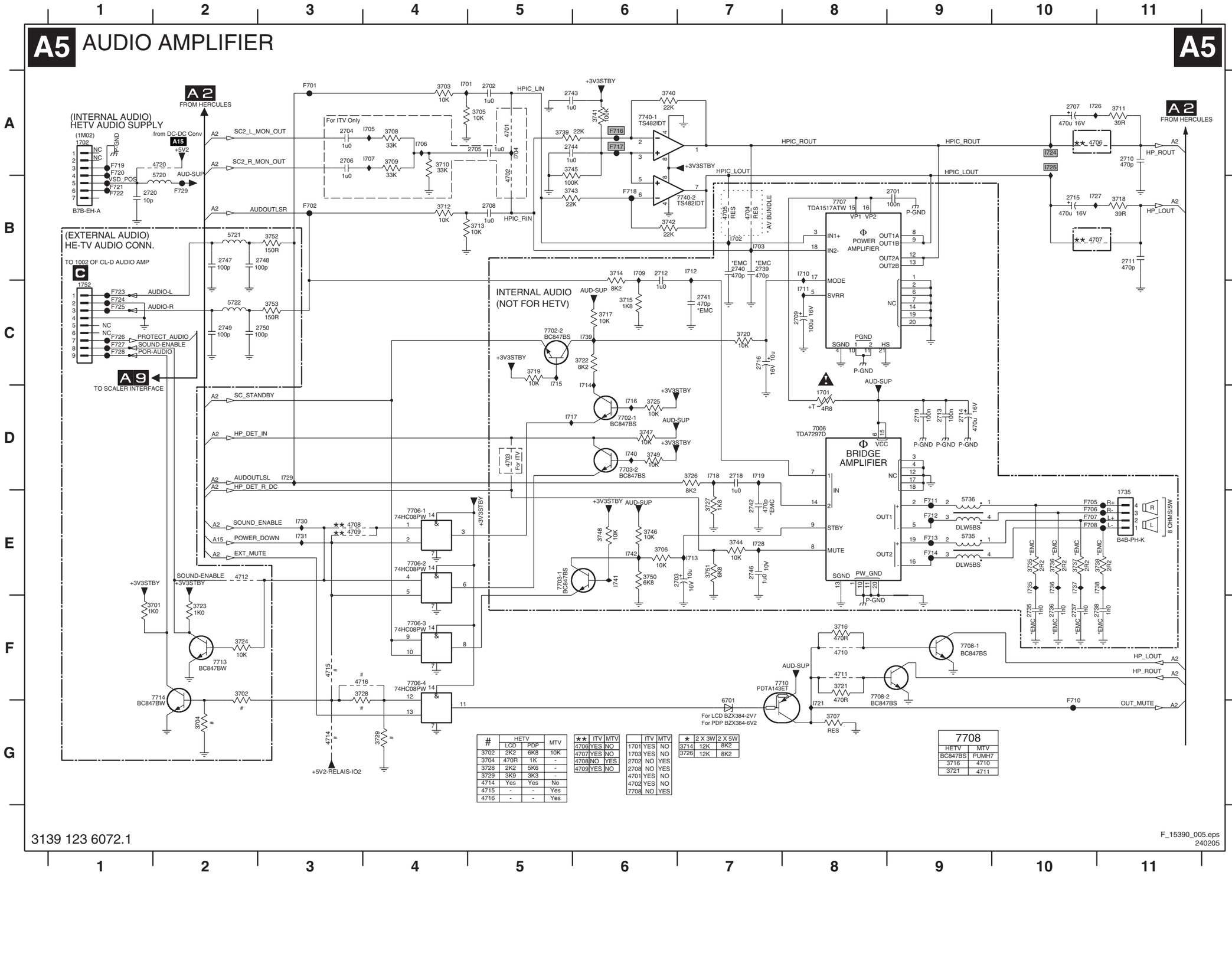
240205

Audio Amplifier

A5 AUDIO AMPLIFIER



#	HETV		MTV
	LCD	PDP	
3702	2K2	6K8	10K
3704	470R	1K	-
3728	2K2	5K6	-
3729	3K9	3K3	-
4714	Yes	Yes	No
4715	-	-	Yes
4716	-	-	Yes

**	ITV	MTV
4706	YES	NO
4707	YES	NO
4708	NO	YES
4709	YES	NO

	ITV	MTV
1701	YES	NO
1703	YES	NO
2702	NO	YES
2708	NO	YES
4701	YES	NO
4702	YES	NO
7708	NO	YES

*	2 X 3W	2 X 5W
3714	12K	8K2
3726	12K	8K2

7708	
HETV	MTV
BC847BS	PUMH7
3716	4710
3721	4711

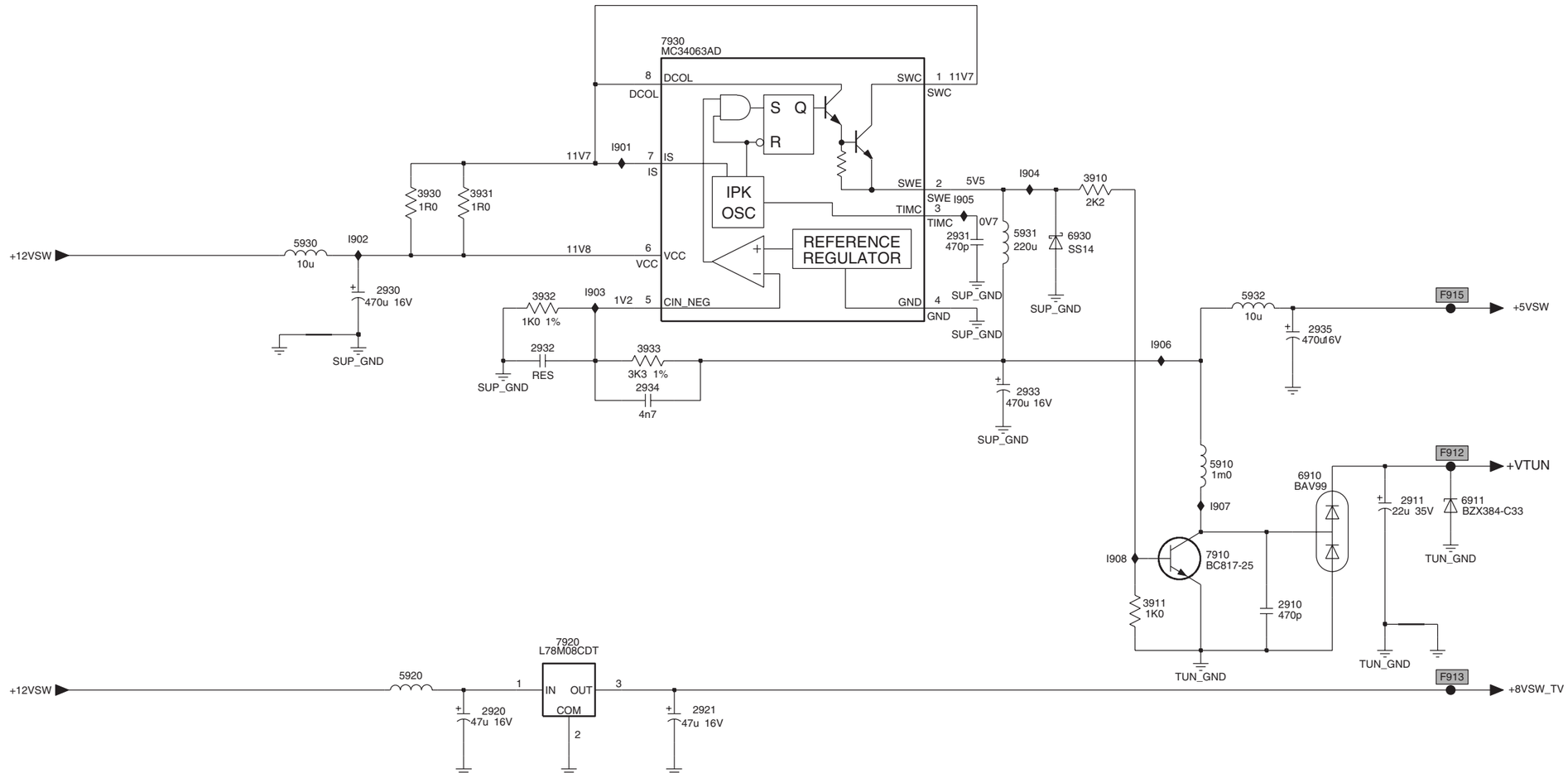
3139 123 6072.1

F_15390_005.eps 240205

1701 D8	4709 E3
1702 A1	4710 F8
1735 D11	4711 F8
1752 C1	4712 E2
2701 B9	4714 G3
2702 A5	4715 F3
2703 E7	4716 F3
2704 A3	4720 A2
2705 A5	5720 B2
2706 A3	5721 B2
2707 A10	5722 C2
2708 B5	5735 E9
2709 C8	5736 E9
2710 A11	6701 G7
2711 B11	7006 D8
2712 B6	7702-1 D6
2713 D9	7702-2 C5
2714 D9	7703-1 E5
2715 B10	7703-2 D6
2716 C7	7706-1 E4
2718 D7	7706-2 E4
2719 D9	7706-3 F4
2720 B1	7706-4 F4
2735 F10	7707 B8
2736 F10	7708-1 F9
2737 F10	7708-2 F8
2738 F11	7710 F8
2739 B7	7713 F2
2740 B7	7714 F2
2741 C7	7740-1 A6
2742 E7	7740-2 B6
2743 A5	F701 A3
2744 A5	F702 B3
2746 E7	F705 E10
2747 B2	F706 E10
2748 B3	F707 E10
2749 C2	F708 E10
2750 C3	F710 G10
3701 F2	F711 E9
3702 F2	F712 E9
3703 A4	F713 E9
3704 G2	F714 E9
3705 A5	F716 A6
3706 E6	F717 A6
3707 G8	F718 B6
3708 A4	F719 A1
3709 A4	F720 A1
3710 A4	F721 B1
3711 A11	F722 B1
3712 B4	F723 C1
3713 B5	F724 C1
3714 B6	F725 C1
3715 C6	F726 C1
3716 F8	F727 C1
3717 C6	F728 C1
3718 B11	F729 B2
3719 C5	I701 A4
3720 C7	I702 B7
3721 F8	I703 B7
3722 C6	I704 A5
3723 F2	I705 A4
3724 F2	I706 A4
3725 D6	I707 A4
3726 D7	I709 B6
3727 E7	I710 B8
3728 F3	I711 C8
3729 G4	I712 B7
3735 E10	I713 E7
3736 E10	I714 D6
3737 E10	I715 C5
3738 E11	I716 D6
3739 A5	I717 D5
3740 A6	I718 D7
3741 A6	I719 D7
3742 B6	I721 G8
3743 B5	I724 A10
3744 E7	I725 A10
3745 A5	I726 A10
3746 E6	I727 B10
3747 D6	I728 E7
3748 E6	I729 D3
3749 D6	I730 E3
3750 E6	I731 E3
3751 E7	I735 E10
3752 B3	I736 E10
3753 C3	I737 E10
4701 A5	I738 E11
4702 B5	I739 C6
4703 D5	I740 D6
4704 B7	I741 E6
4705 B7	I742 E6
4706 A10	
4707 B10	
4708 E3	

TV Supply

A6 TV-SUPPLY



2910 D8
2911 D9
2920 E4
2921 E5
2930 C3
2931 B6
2932 C4
2933 C7
2934 C4
2935 C8
3910 B7
3911 D7
3930 B3
3931 B4
3932 C4
3933 C4
5910 D8
5920 E3
5930 C3
5931 B7
5932 C8
6910 D8
6911 D9
6930 C7
7910 D7
7920 E4
7930 A5
F912 D9
F913 E9
F915 C9
I901 B4
I902 C3
I903 C4
I904 B7
I905 B6
I906 C7
I907 D8
I908 D7

3139 123 6072.1

F_15390_006.eps
240205

Scaler

A7 SCALER

SCALER

A16 RESERVED TO PCHD-IO

A2 TO HERCULES

A13 FROM/TO PCHD-MUX

A9 TO SCALER INTERFACE

A12 FROM HDMI

A9 TO SCALER INTERFACE

A13 TO PCHD-MUX

A16 FROM PCHD-IO

A9 TO 1409 SCALER INTERFACE

A12 TO HDMI

A15 FROM SUPPLY

A11 TO FLASH CONTROL

A10 FROM SDRAM

A13 TO PCHD-MUX

A12 TO HDMI

A9 TO SCALER INTERFACE

A16 TO PCHD-IO

A2

A11 TO FLASH CONTROL

A13 TO HERCULES / HISTOGRAM TO PCHD-MUX

A14 TO SUPPLY

For SW testing use (RES)

3139 123 6072.1

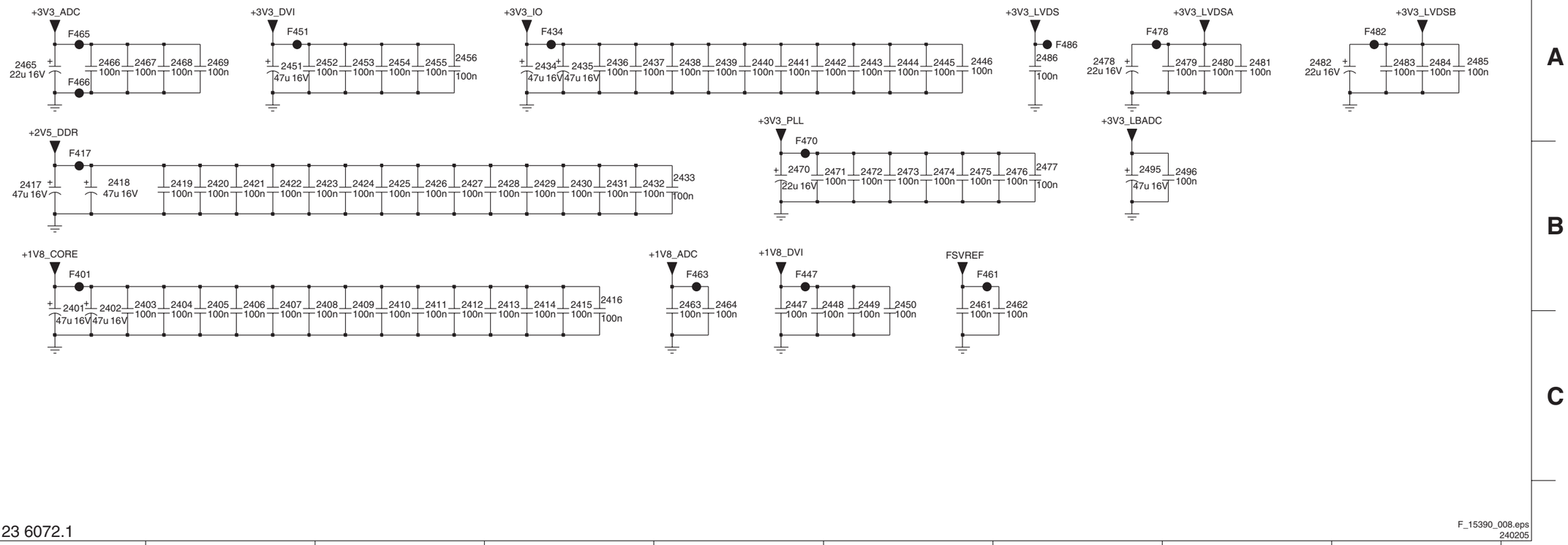
F_15390_007.eps
240205

Scaler Supply

2401 B1 2405 B2 2409 B3 2413 B4 2417 B1 2421 B2 2425 B3 2429 B4 2433 B5 2437 A4 2441 A5 2445 A6 2449 B6 2453 A3 2461 B6 2465 A1 2469 A2 2473 B6 2477 B7 2481 A8 2485 A9 F401 B1 F451 A2 F466 A1 F486 A7
2402 B1 2406 B2 2410 B3 2414 B4 2418 B1 2422 B2 2426 B3 2430 B4 2434 A4 2438 A5 2442 A6 2446 A6 2450 B6 2454 A3 2462 B7 2466 A1 2470 B5 2474 B6 2478 A7 2482 A8 2486 A7 F419 B1 F461 B6 F470 B5
2403 B1 2407 B2 2411 B3 2415 B4 2419 B2 2423 B3 2427 B3 2431 B4 2435 A4 2439 A5 2443 A6 2447 B5 2451 A2 2455 A3 2463 B5 2467 A1 2471 B6 2475 B6 2479 A8 2483 A9 2495 B7 F434 A4 F463 B5 F478 A7
2404 B2 2408 B3 2412 B3 2416 B4 2420 B2 2424 B3 2428 B4 2432 B4 2436 A4 2440 A5 2444 A6 2448 B6 2452 A3 2456 A3 2464 B5 2468 A2 2472 B6 2476 B7 2480 A8 2484 A9 2496 B8 F447 B5 F465 A1 F482 A9

1 2 3 4 5 6 7 8 9

A8 SCALER SUPPLY



A B C

3139 123 6072.1

F_15390_008.eps
240205

Scaler Interface

A9 SCALER INTERFACE

A9

A7 TO SCALER

FOR PDP ONLY

4871
4872
+3V3STBY
5872
2872 100n
7872 PCA9515DP
VCC
A7 SDA_IO 3 SDA0 SDA1 6 3871 68R SDA_DMA_BUS1_DISP F870
A7 SCL_IO 2 SCL0 SCL1 7 3870 68R SCL_DMA_BUS1_DISP F871
BUF_ENABLE 5 EN GND NC 1 NC
2870 10p
2871 10p

1860 DLW21S 2860 10p 2861 10p
1861 DLW21S 2862 10p 2863 10p
1862 DLW21S 2864 10p 2865 10p
1863 DLW21S 2866 10p 2867 10p
1864 DLW21S 2868 10p 2869 10p

A7 TXB3+
A7 TXB3-
A7 TXBC+
A7 TXBC-
A7 TXB2+
A7 TXB2-
A7 TXB1+
A7 TXB1-
A7 TXB0+
A7 TXB0-

(1G50) 1450
LVDSD+
LVDSD-
LVDSCLK+
LVDSCLK-
LVDSC+
LVDSC-
LVDSB+
LVDSB-
F874
LVDSA+
LVDSA-
(NC)CTRL_DISP3
(NC)CTRL_DISP2
(NC)CTRL_DISP1
(NC)VDISP_2
(NC)VDISP2
LVDS CONNECTOR
FI-WE31P-HF-E1500
F873

A14 PAN_VCC F872 5874 +12V_LCD
2874 10p
2875 10p
FOR LCD ONLY

PROVISION FOR PIXEL+ MODULE
1409 (RES)
+5VSWI F411
+3V3STBY F412
PIXEL+_SYNC F413
PIXEL+_RESET F414
SCL_IO F415
SDA_IO F416
F418
S9B-PH-SM4-TB(LF)

FOR LCD ONLY
BU_LHT_ADJ2
4428 RES
3427 RES
I428
4427 RES
I436
BU_LIGHT_ADJ2 (NC)
2494 RES
+5VSWI +5VSWI
3418 390R
BU_LHT_ADJ1
3416 1K0
7416 SI2301DS-T1
3460 RES
I444
4445 RES
I437
BU_LIGHT_ADJ1
3444 10K
I445
4444
3417 1K0
2493 1u0
3876 68R
2876 10n
2879 10n
LAMP_ON-OFF
3879 68R
2878 10n
2881 10n

A5 FROM AUDIO AMPLIFIER
BACKLIGHT_CTRL
LIGHT_ON
FAN_SPEED
STANDBY
PROTECT_AUDIO
POWER_OK
1403 I860 I861 I862 I863 I864 NC I865 I866 I869 I868
PIN 1, 3 & 7 TO X200 OF PSU

POR
A2 FROM HERCULES
+3V3STBY 3886 10K I871
SC_STANDBY A2 3887 10K I870 7887 BC847BW
2884 10n
+5V2_RELAIS_IO2 4887 RES
4888 (PDP)
3877 68R
3883 68R
2877 10p
2883 10p
2887 10p
2880 10p

FAN_SPEED1
POWER_OK_UP
FOR PDP ONLY
I872 5882 1u0
I867 3885 68R
2882 10p
2885 10p
2886 10u
2889 10p

BUF_ENABLE

1403 D12
1409 A7
1450 D5
1860 D3
1861 D3
1862 E3
1863 F3
1864 F3
2493 C9
2494 C7
2860 D3
2861 D3
2862 D3
2863 D3
2864 E3
2865 E3
2866 E3
2867 F3
2868 F3
2869 F3
2870 C4
2871 C5
2872 B3
2874 G4
2875 G5
2876 C10
2877 E9
2878 D10
2879 C11
2880 E10
2881 D11
2882 F9
2883 E9
2884 E8
2885 F9
2886 F10
2887 E10
2889 F10
3416 C7
3417 C8
3418 C7
3427 C7
3444 C8
3460 C8
3870 C4
3871 B4
3876 C10
3877 D9
3879 D10
3883 E9
3885 F9
3886 D8
3887 E7
4427 C7
4428 C7
4444 C9
4445 C8
4871 B3
4872 B3
4887 E7
4888 E7
5872 B3
5874 G5
5882 F9
7416 C7
7872 B2
7887 E8
F411 A7
F412 B7
F413 B7
F414 B7
F415 B7
F416 B7
F418 B7
F870 B5
F871 C5
F872 G4
F873 F5
F874 E5
I428 C7
I436 C8
I437 C9
I444 C8
I445 C9
I860 D12
I861 D12
I862 D12
I863 D12
I864 D12
I865 E12
I866 E12
I867 F9
I868 E12
I869 E12
I870 E8
I871 E8
I872 F9

3139 123 6072.1

F_15390_009.eps
240205

SDRAM

A10 SDRAM

A10

+2V5_DDR

2501 47u, 2502 47u, 2503 100n, 2504 100n, 2505 100n, 2506 100n, 2507 100n, 2508 100n, 2509 100n, 2510 100n, 2511 100n, 2512 100n, 2513 100n, 2514 100n, 2515 100n, 2516 100n

+2V5_DDR

3501 10K 1%

F501

FSVREF

2526 16V 22u

2517 100n

3502 10K 1%

+2V5_DDR

A7 FSCLK+ — I503 — 3503 150R 1% — I502 — A7 FSCLK-

7501 K4D263238M-QC50

SDRAM 1M X 32 X 4

VREF, VDD, VDDQ, VSS, VSSQ, NC, RFU, MCL, DQS

A7 FSRAS, FSCAS, FSWE → CS, RAS, CAS, WE

A7 FSCLK+, FSCLK- → CK, CK

A7 FSCKE → CKE

A7 FSDQM0..FSDQM3 → DM

A7 FSBKSEL0, FSBKSEL1 → BA

A7 FSADDR0..FSADDR11 → A

A7 FSDQS

A7 FSDATA0..FSDATA31

A7 TO/FROM SCALER

F_15390_010.eps
240205

3139 123 6072.1

2501 A1
2502 A1
2503 A1
2504 A2
2505 A2
2506 A2
2507 A3
2508 A3
2509 A3
2510 A3
2511 A4
2512 A4
2513 A4
2514 A5
2515 A5
2516 A5
2517 B4
2526 B4
3501 B3
3502 B3
3503 B3
7501 B4
F501 B3
I502 B3
I503 B3

Flash / Control

A11 FLASH / CONTROL

A11

Item	LCD 30"	PQP 42"	AUO 30"	LCD 32"
3549	1K	1K	RES	RES
3551	1K	RES	RES	RES
3552	1K	1K	RES	RES
3553	1K	1K	1K	RES
3550	1K	1K	1K	1K

A7 TO SCALER

+3V3_IO

5530

F530

2533 100n

2530 10u 16V

7530 M29W040B-55K1

ROM 512Kx8 [FLASH]

OCMADDR0 12
OCMADDR1 11
OCMADDR2 10
OCMADDR3 9
OCMADDR4 8
OCMADDR5 7
OCMADDR6 6
OCMADDR7 5
OCMADDR8 27
OCMADDR9 26
OCMADDR10 23
OCMADDR11 25
OCMADDR12 4
OCMADDR13 28
OCMADDR14 29
OCMADDR15 3
OCMADDR16 2
OCMADDR17 30
OCMADDR18 1

#OCM_RE 24 OE
#OCM_WE 31 WE
#ROM_CS 22 CE

A 0 512K-1

DQ 0..7

OCMDATA0 13
OCMDATA1 14
OCMDATA2 15
OCMDATA3 17
OCMDATA4 18
OCMDATA5 19
OCMDATA6 20
OCMDATA7 21

+3V3_IO

3547-1 3547-2 3547-3 3547-4 3548 10K

3550 RES
3553 RES
3552 RES
3551 RES
3549 RES

OCMADDR0 3546-4 10K
OCMADDR1 3546-3 10K
OCMADDR2 3546-2 10K
OCMADDR3 3546-1 10K

OCMADDR4 3545-4 10K
OCMADDR5 3545-3 10K
OCMADDR6 3545-2 10K
OCMADDR7 3545-1 10K

OCMADDR8 3544-2 10K
OCMADDR9 3544-1 10K
OCMADDR10 3544-3 10K
OCMADDR11 3544-4 10K

OCMADDR12 3538-1 10K
OCMADDR15 3538-2 10K
OCMADDR16 3538-3 10K
OCMADDR18 3538-4 10K

OCMADDR17 3539-1 10K
OCMADDR14 3539-2 10K
OCMADDR13 3539-3 10K
OCMADDR19 3539-4 10K

+3V3_IO

3540-1 3540-3 3540-4 3540-2 10K

3536 10K

F536 F540 F537 F538 F539

1530

F541

B2B-PH-SM4-TBT(LF) FOR TESTING USE (RES)

3541 RES 3542 RES 3543 RES

+3V3STBY +3V3STBY

3531 10K

2531 100n

7531 M24C32-WMN6T

Φ (4Kx8) EEPROM

NVM-WP F531 WC
SCL_IO F532 SCL
SDA_IO F533 SDA

ADR 0 1 2

+3V3STBY

2532 100n

1532 SKQR

For Software Development only - (RES)

F534

7532 NE56610-27

MR SUB VCC GND VOUT

F535

3534 1K0

3533 RES

3532 10K

#RESET A7 A12

A7 TO SCALER

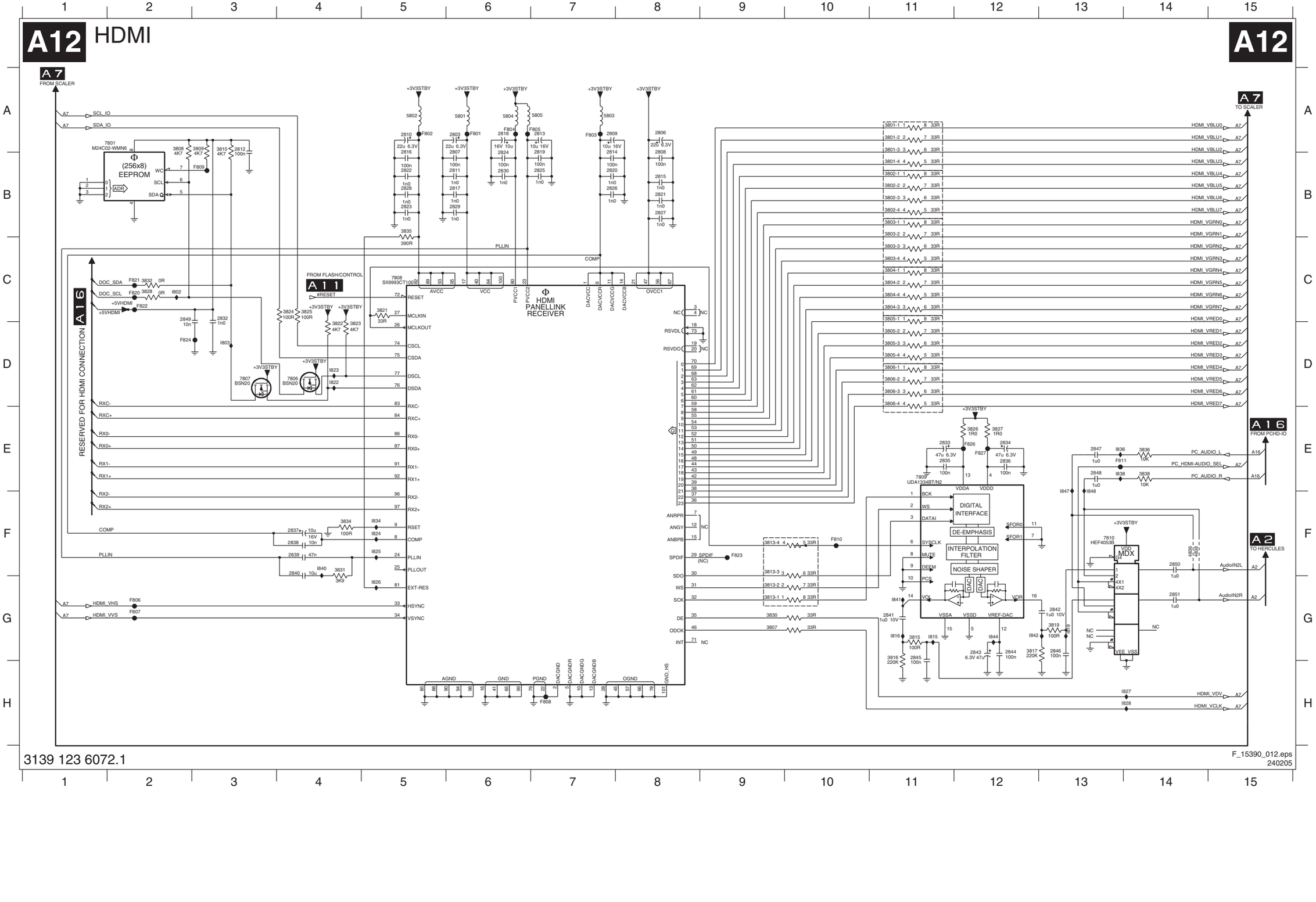
TO HDMI A12

F_15390_011.eps 240205

3139 123 6072.1

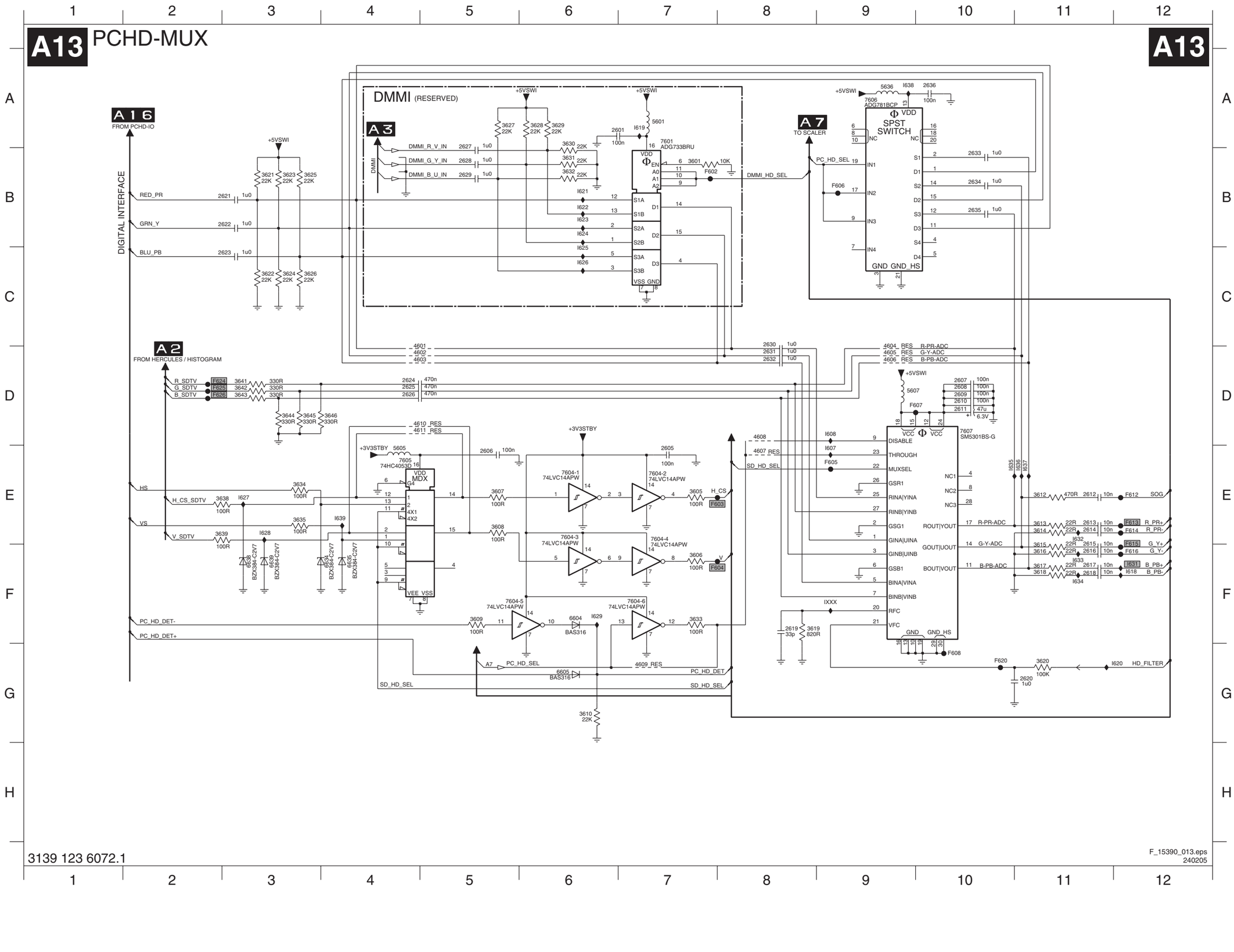
1530 C7
1532 E4
2530 B3
2531 E2
2532 E4
2533 B3
3531 E2
3532 F4
3533 F6
3534 E6
3536 C7
3538-1 C5
3538-2 C5
3538-3 C5
3538-4 C5
3539-1 D5
3539-2 D5
3539-3 D5
3539-4 D5
3540-1 C6
3540-2 C6
3540-3 C6
3540-4 C6
3541 D6
3542 D6
3543 D7
3544-1 C5
3544-2 C5
3544-3 C5
3544-4 C5
3545-1 C5
3545-2 C5
3545-3 C5
3545-4 C5
3546-1 B5
3546-2 B5
3546-3 B5
3546-4 B5
3547-1 B5
3547-2 B5
3547-3 B6
3547-4 B6
3548 B6
3549 B6
3550 B6
3551 B6
3552 B6
3553 B6
5530 A2
7530 B2
7531 E3
7532 E5
F530 B2
F531 E2
F532 F2
F533 F2
F534 F4
F535 F5
F536 C7
F537 C6
F538 C6
F539 D6
F540 C7
F541 D7

HDMI



PCHD MUX

A13 PCHD-MUX



3139 123 6072.1

F_15390_013.eps
240205

2601 A7 7606 A9
2605 E7 7607 D10
2606 E5 F602 B7
2607 D10 F603 E8
2608 D10 F604 F8
2609 D10 F605 E9
2610 D10 F606 B9
2611 D10 F607 D10
2612 E11 F608 G10
2613 E11 F612 E12
2614 E11 F613 E12
2615 F11 F614 E12
2616 F11 F615 F12
2617 F11 F616 F12
2618 F11 F620 G10
2619 F8 F624 D2
2620 G11 F625 D2
2621 B3 F626 D2
2622 B3 I607 E9
2623 C3 I608 D9
2624 D4 I618 F12
2625 D4 I619 A7
2626 D4 I620 G12
2627 A5 I621 B6
2628 B5 I622 B6
2629 B5 I623 B6
2630 C8 I624 B6
2631 D8 I625 C6
2632 D8 I626 C6
2633 B10 I627 E3
2634 B10 I628 E3
2635 B10 I629 F6
2636 A10 I630 F9
3601 B7 I631 F12
3605 E7 I632 E11
3606 F7 I633 F11
3607 E5 I634 F11
3608 E5 I635 E10
3609 F5 I636 E11
3610 G6 I637 E11
3612 E11 I638 A9
3613 E11 I639 E4
3614 E11
3615 F11
3616 F11
3617 F11
3618 F11
3619 F8
3620 G11
3621 B3
3622 C3
3623 B3
3624 C3
3625 B3
3626 C3
3627 A5
3628 A6
3629 A6
3630 A6
3631 B6
3632 B6
3633 F7
3634 E3
3635 E3
3638 E2
3639 E2
3641 D3
3642 D3
3643 D3
3644 D3
3645 D3
3646 D4
4601 D5
4602 D5
4603 D5
4604 D9
4605 D9
4606 D9
4607 E8
4608 D8
4609 G7
4610 D5
4611 D5
5601 A7
5605 E4
5607 D9
5636 A9
6604 F6
6605 G6
6634 F4
6635 F4
6638 F3
6639 F3
7601 A7
7604-1 E6
7604-2 E7
7604-3 E6
7604-4 E7
7604-5 F6
7604-6 F7
7605 E4

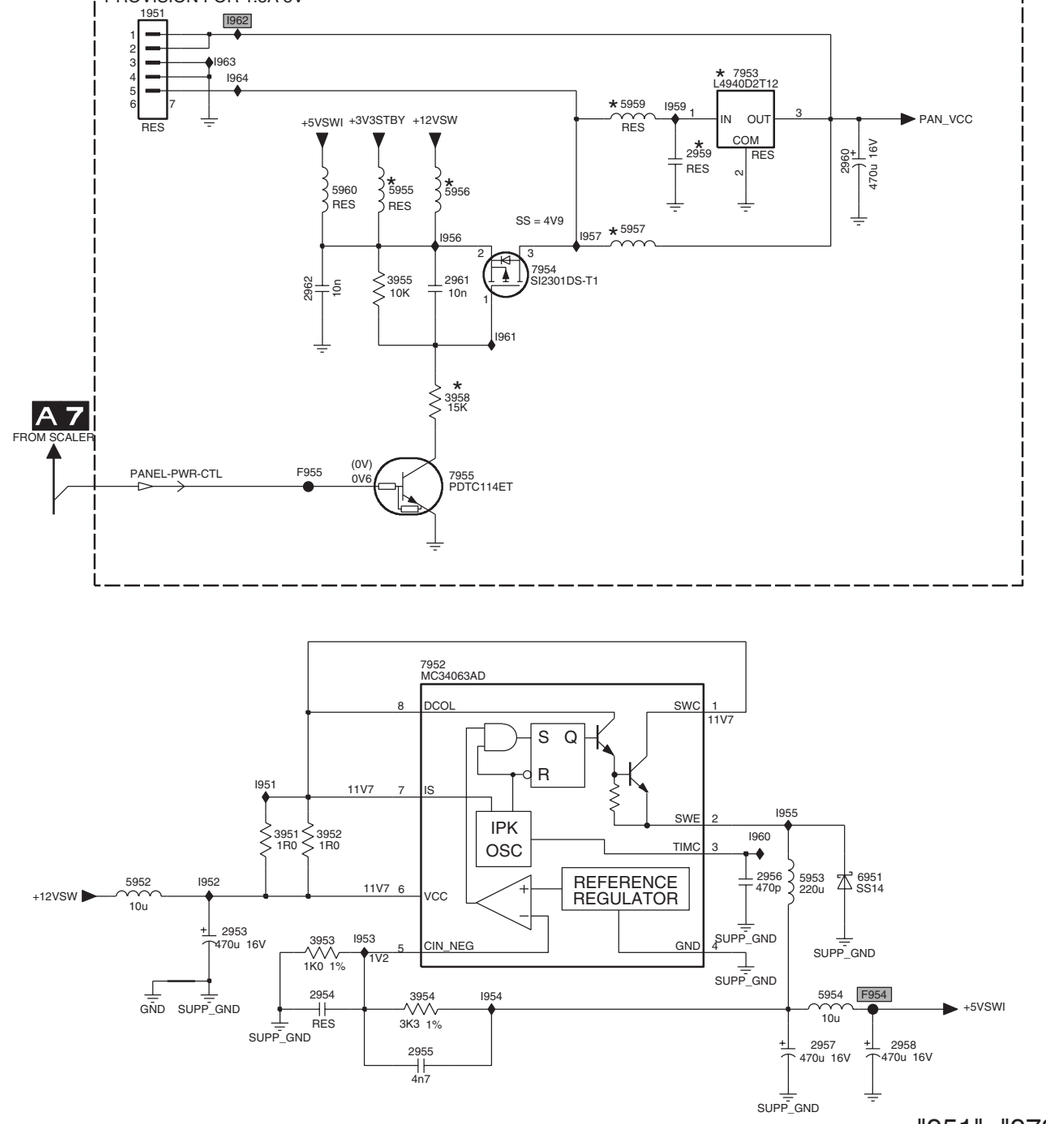
Supply

A14 SUPPLY

A14

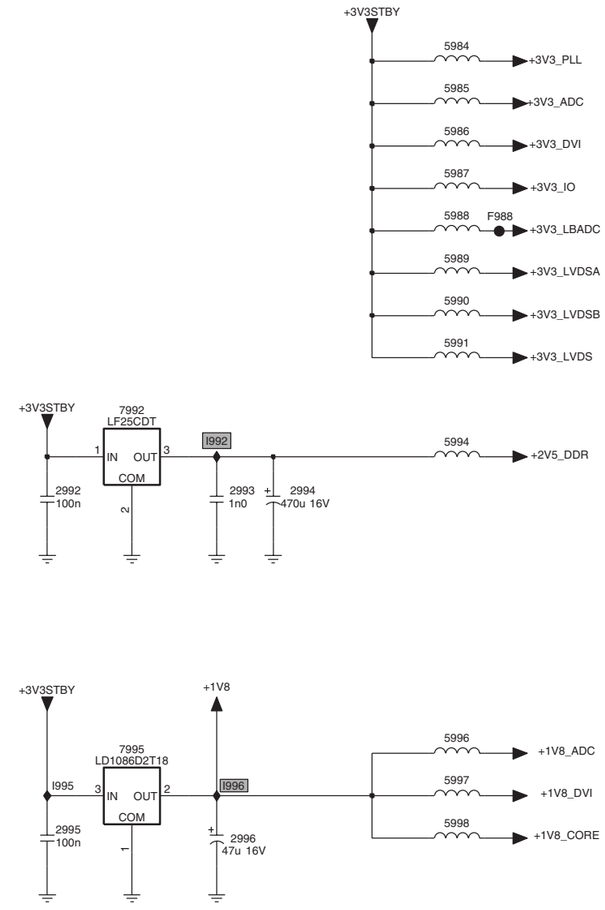
NOT FOR PDP

PROVISION FOR 1.5A 5V



"951"~"979"

SUPPLY FOR SCALER



"980"~"999"

ITEM	13"	≥15"
2959	---	100N
3958	1K	15K
5954	---	YES
5955	YES	---
5956	---	YES
5957	YES	---
7953	---	L4940D2T12

1951 B1
2953 F2
2954 G2
2955 G3
2956 F5
2957 G5
2958 G5
2959 B4
2960 B5
2961 C3
2962 C2
2992 D7
2993 D8
2994 D8
2995 E7
2996 F8
3951 F2
3952 F2
3953 F2
3954 G3
3955 C3
3958 D3
5952 F1
5953 F5
5954 G5
5955 B3
5956 B3
5957 C4
5959 B4
5960 B2
5984 B9
5985 B9
5986 B9
5987 B9
5988 B9
5989 C9
5990 C9
5991 C9
5994 D9
5996 E9
5997 E9
5998 E9
6951 F5
7952 E3
7953 B4
7954 C4
7955 D3
7992 C8
7995 E8
F954 G5
F955 D2
F988 B9
I951 E2
I952 F2
I953 F3
I954 G3
I955 F5
I956 C3
I957 C4
I959 B4
I960 F5
I961 C3
I962 B2
I963 B2
I964 B2
I992 D8
I995 E7
I996 E8

F_15390_014.eps
240205

DC-DC Converter

A15 DC-DC CONVERTER

A15

SUPPLY

1251
PIN 1, 2, 6, 7, 8 & 9 TO X200 OF PSU
F251
F252
F253
NC
F254
F255
NC
F257
NC
3251 1R0 RES
I264
+8V6
4251
+12V
5251
+12VUNREG
F258
+12VSW
+5V
5252
5253
5254
+9V_STBY_PDP
2251 10p
2252 10p
2254 10u 16V
2253 10u 16V

1252
for ITV only

A3
TO/FROM 1M20 OF HERCULES

4255 (PDP)
+5V2
+5V2_RELAIS_IO2
A3
A3
2255 10p (PDP)
5257 (LCD)
5258 (LCD)
I251
5259 (PDP)

7260 LF33CPT
I252
IN OUT
CTRL NC
COM
I253
NC
F260
+3V3STBY

3259 10K
6259 SS14
3260 6K8
2261 RES
2262 47u 16V

+12VUNREG
6262 SS24
I254
5262 10u
I255

7262 L5973D
VCC VREF
INH
SYNC
GND GND_HS
NC
OUT
FB
COMP
I256
I257
I258
5267 33u
I260
5268 10u
6267 SS36
3267 5K6 1%
2268 470u 16V
2269 470u 16V
2263 10u
2264 10u
2265 220p
2266 22n
I259
3266 4K7
3268 3K3 1%

SupplyGnd

+12VUNREG
+3V3STBY
6270 BZX384-C8V2
I261
3270 2K2
3273 220K
3274 22K
A2 A5 A7
F259
POWER_DOWN
I263
7272 BC847BW
I262
7271 BC847BW
3271 820R
2271 10n

3139 123 6072.1

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240205

1251 A1
1252 B1
2251 B2
2252 B3
2253 B3
2254 B3
2255 B2
2261 C4
2262 C4
2263 D3
2264 D4
2265 E5
2266 E6
2268 D7
2269 D7
2271 B6
3251 A2
3259 C2
3260 C3
3266 E6
3267 D6
3268 E6
3270 B6
3271 B6
3273 B7
3274 B7
4251 A2
4255 B2
5251 A3
5252 B3
5253 B3
5254 B2
5257 B3
5258 C3
5259 C3
5262 D3
5267 D6
5268 D7
6259 C3
6262 D3
6267 D6
6270 A6
7260 C5
7262 D4
7271 B7
7272 B7
F251 A1
F252 A1
F253 A1
F254 A1
F255 B1
F257 B1
F258 A4
F259 B7
F260 C7
I251 C3
I252 C4
I253 C4
I254 D3
I255 D4
I256 D5
I257 D5
I258 D5
I259 E5
I260 D7
I261 A6
I262 B6
I263 B6
I264 A2

PCHD IO

A16 PCHD-IO

VGA Connector

1687
F680
F681
F682
F683
F684
F685
F686
F687
788624-1
2784 330p
2785 330p
2688 100n
SCL_VGA
SDA_VGA

F688 3782 150R
I682 BAS316 6693 I683 5686 DDC_5V
F689 3784 1K0
I684 3783 10K +5VSWI

5683 3683 75R RED_PR A13
5684 3684 75R GRN_Y A13
5687 3687 75R BLU_PB A13
3689 100R I690 PC_HD_DET+ A13 PC_HD_DET- A13
3788 1K0
5685 3686 220R 3685 2K2 2686 100p I681 HS A13
5680 3681 220R 3680 2K2 2681 100p I680 VS A13

A13 TO PCHD-MUX

DDC_5V
I685 2693 100n
DDC_5V
3696 10K
3697 10K

Φ (256x8) EEPROM
WC F690 3693 10K
SCL
SDA
ADR
7693 M24C02-WMN6

3786 RES UART_RX A7
3787 RES UART_TX A7

A7 TO SCALER

TO 1105 OF REAR IO SCART
A17 PC_AUDIO-L I722 S698 3698 150R I699 PC_AUDIO_L A12
A17 PC_AUDIO-R I723 S699 3699 150R I700 PC_AUDIO_R A12
2698 100p 3700 47K 2699 100p 3781 47K

A17
A12 TO HDMI

1687 A1
2681 D7
2686 D7
2688 C2
2693 D2
2698 F3
2699 F4
2784 C1
2785 C2
3680 D6
3681 D6
3683 A6
3684 B6
3685 D6
3686 C6
3687 B6
3689 C5
3693 D3
3696 D4
3697 D4
3698 E3
3699 F3
3700 F4
3781 F4
3782 B2
3783 B3
3784 B2
3786 D5
3787 E5
3788 C6
5680 D5
5683 A6
5684 B6
5685 C5
5686 B3
5687 B6
6693 B3
7693 E2
F680 A1
F681 A1
F682 A1
F683 A1
F684 B1
F685 B1
F686 B1
F687 B1
F688 B2
F689 B2
F690 D3
I680 D8
I681 C8
I682 B2
I683 B3
I684 B2
I685 D2
I690 C8
I699 E8
I700 F8
I722 E2
I723 E2
S698 E2
S699 F2

3139 123 6072.1

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Rear IO Scart

A17 REAR IO SCART

A17

SCART 1 — 1101 — HR-AG0741S-0

Audio-R_out, Audio-R_in, Audio-L_out, Audio-L_in, RGB-B_in, Function_Sw, RGB-G_in, RGB-R_in, RGB-BL_in, Terr_CVBS_out, Video_in

A2 TO HISTOGRAM & HERCULES

SC1_R_RF_OUT, SC1_COMP_AV1_R_IN, SC1_L_RF_OUT, SC1_COMP_AV1_L_IN, SC1_COMP_B_U_IN, STATUS_1, SC1_COMP_AV1_G_Y_CVBS_IN, SC1_COMP_R_V_IN, SC1_FBL_IN, SC1_CVBS_RF_OUT, SC1_CVBS_IN, PC_AUDIO-R, PC_AUDIO-L, Const_R_OUT, Const_L_OUT

SC2_R_MON_OUT, SC2_R_IN, SC2_L_MON_OUT, P50, SC2_L_IN, STATUS_2, SC2_C_IN, SC2_CVBS_MON_OUT, SC2_Y_IN

SCART 2 — 1102 — HR-AG0741S-0

Audio-R_out, Audio-R_in, Audio-L_out, Audio-L_in, Function_Sw, YC-C_in, CVBS_out, Video/YC-Y_in

MONITOR OUTPUT — 1105 — LPR6520-E645

Audio-RIGHT, Audio-LEFT

+5VSW, +5VSW_1

7119 BC847B, 7138 BC847B, RES, BZX384-C6V8

3139 123 6072.1

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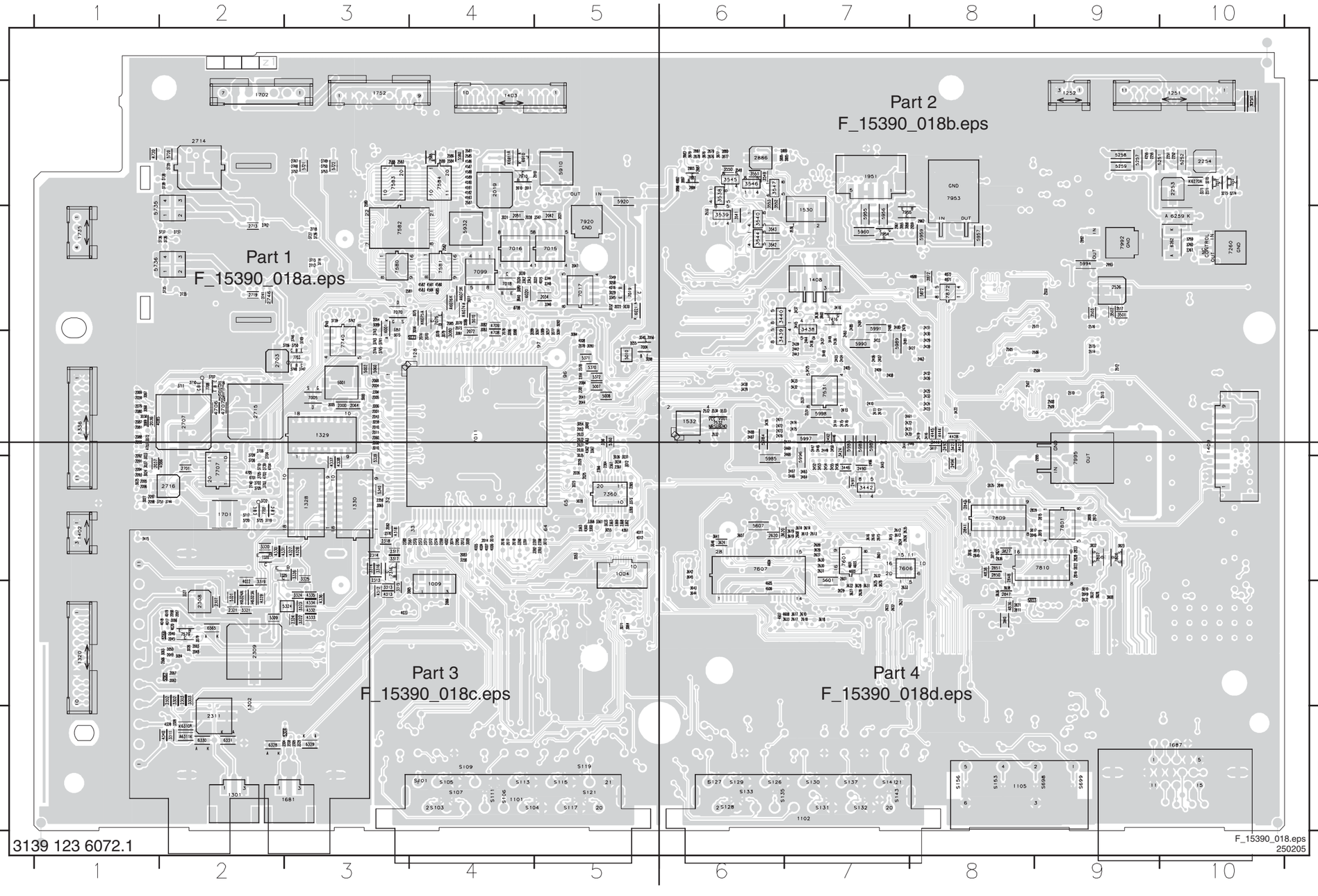
240205

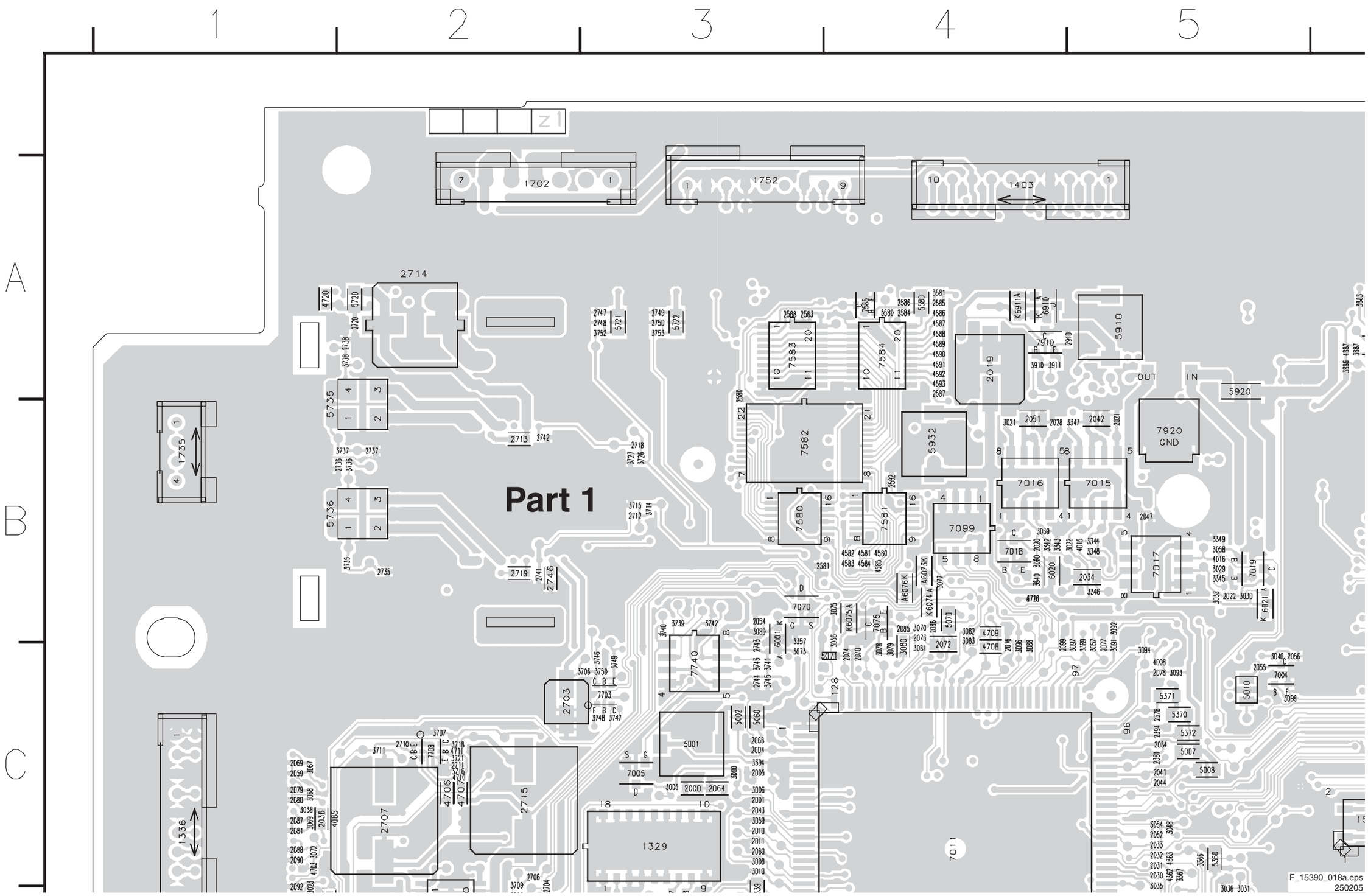
1101-1 A2
1102-1 A12
1105 F2
2101 A4
2103 B4
2104 A5
2105 B4
2107 C4
2108 B5
2109 A2
2110 A2
2111 A2
2112 B2
2127 A10
2128 A9
2129 B10
2131 B10
2132 C9
2133 C10
2134 A11
2135 A11
2136 B11
2137 B11
2138 D9
2139 F4
2140 F4
2152 G4
2153 G3
2155 G4
2157 G3
2169 E2
3101 A4
3102 A4
3103 A4
3104 B4
3105 B4
3106 B4
3107 C4
3108 B4
3109 C4
3110 C4
3111 C4
3112 D4
3113 D4
3114 D4
3115 E4
3116 D4
3117 E4
3118 E4
3119 E3
3120 F5
3121 F3
3122 F3
3123 F3
3124 A4
3125 A4
3126 A9
3127 A10
3128 B9
3129 A10
3130 B9
3131 B10
3132 C9
3133 C10
3134 C9
3135 C10
3136 D9
3137 D10
3138 D9
3139 D9
3140 D10
3141 D10
3142 E9
3143 E10
3144 B4
3145 B4
3146 G4
3147 G4
3148 A9
3149 A9
3150 B9
3151 C9
3152 G4
3153 G3
3155 G4
3156 G3
3169 E2
4101 A3
4139 F4
5139 F4
6121 F3
6143 E10
7119 F4
7138 D9
F101 A3
F102 B11
F103 A3
F104 B11
F105 B3
F106 A2
F107 B3
F108 C2
F109 C3
F110 A11
F111 C3
F113 D3
F115 D3
F117 E3
F119 E3
F120 F5
F121 F3
F125 F3
F127 A10
F128 A10
F129 B10
F130 B10
F131 B11
F133 C10
F134 C9
F135 C10
F137 D10
F141 D10
F143 E10
I102 A5
I104 A5
I106 B5
I110 B5
I112 C5
I114 D5
I116 D5
I118 E5
I119 E3
I120 F4
I126 A9
I128 A9
I132 C9
I136 D9
I139 D9
I140 D10
I142 E9
I150 C5
S101 A3
S103 B3
S104 C2
S105 B3
S106 B2
S107 C3
S109 C3
S111 D3
S113 D3
S115 E3
S117 E3
S119 F2
S121 F2
S126 B11
S127 A10
S128 B10
S129 B10
S130 B11
S131 C11
S132 C11
S133 C10
S135 C10
S137 D10
S141 D10
S143 E10
S153 G3
S156 G3

Layout TV & Scaler Board (Top Side Overview)

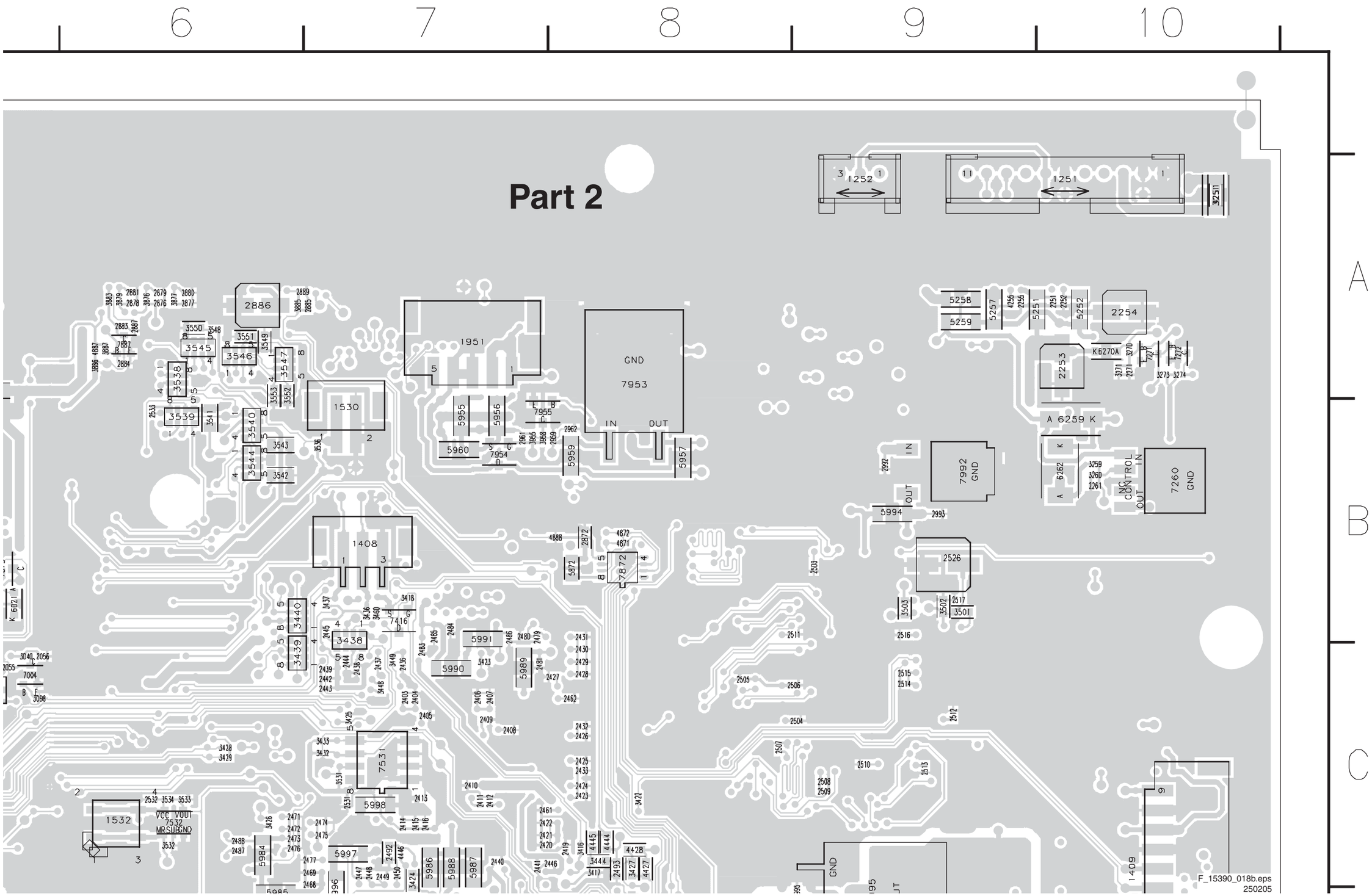
1004 D5 2010 C3 2031 C5 2053 D5 2074 C4 2094 D1 2311 F2 2372 D4 2410 C7 2430 C8 2450 C7 2475 C7 2503 B9 2533 B6 2614 D7 2634 D7 2719 B2 2812 D9 2846 D8 2889 A6 3022 B5 3040 C5 3073 C3 3097 C5 3316 D3 3346 B5 3390 D4 3725 D2 4586 A4 6310 F2
1009 E4 2011 C3 2032 C5 2054 B3 2076 C4 2095 D1 2313 D3 2373 D4 2411 C7 2431 B8 2452 D7 2476 C6 2504 C9 2566 E2 2615 D7 2635 D7 2720 A2 2815 D9 2847 E8 2910 A5 3023 D1 3048 C5 3074 D4 3098 C5 3317 D3 3347 B5 3391 D4 3726 B3 4587 A4 6311 F2
1301 F2 2013 D4 2033 C5 2055 C5 2077 C5 2096 D1 2314 D3 2374 D4 2412 C7 2432 C8 2453 D7 2477 C7 2505 C8 2580 A3 2616 D7 2636 D7 2735 B2 2816 D9 2848 D8 2959 B8 3024 D1 3054 C5 3075 B4 3251 A10 3319 E2 3348 B5 3392 D5 3727 B3 4588 A4 6323 E2
1328 D3 2014 D4 2034 B5 2056 C5 2078 C5 2097 D1 2317 D3 2378 C5 2413 C7 2433 C8 2454 D7 2479 B7 2506 C9 2581 B3 2617 E7 2701 D2 2736 B2 2817 D8 2849 E9 2961 B7 3025 D1 3055 D5 3077 B4 3259 B10 3320 D2 3349 B5 3393 D5 3728 B4 4589 A4 6324 E2
1329 C3 2015 D4 2036 C1 2057 E2 2079 C1 2098 D1 2318 D3 2381 C5 2414 C7 2436 C7 2455 D7 2480 B7 2507 C8 2582 B4 2618 E7 2702 D2 2737 B2 2821 E8 2850 D8 2962 B8 3026 E2 3056 B4 3078 C4 3260 B10 3321 E2 3357 B3 3394 C3 3735 B2 4590 A4 6328 F2
1330 D3 2016 D4 2037 D1 2058 E2 2080 C1 2099 C4 2321 E2 2387 D4 2415 C7 2437 C7 2456 D7 2481 C7 2508 C9 2583 A3 2619 D7 2703 C2 2738 A2 2822 D9 2851 D8 2992 B9 3027 D1 3057 C5 3079 C4 3270 A10 3322 E3 3358 D4 3415 D1 3736 B2 4591 A4 6329 F3
1408 B7 2017 D4 2041 C5 2059 C1 2081 C1 2251 A10 2324 E3 2388 D3 2416 C7 2438 C7 2461 C7 2483 C7 2509 C9 2584 A4 2620 D6 2704 D2 2739 D2 2823 D9 2872 B8 2993 B9 3028 D5 3058 B5 3080 C4 3271 A10 3323 E3 3360 D5 3416 C8 3737 B2 4592 A4 6330 F2
1409 C10 2018 D4 2042 B5 2060 C3 2082 D3 2252 A10 2358 D4 2394 C5 2419 C8 2439 C7 2462 C8 2484 B7 2510 C9 2585 A4 2621 E7 2705 D2 2740 D2 2827 D8 2876 A6 2995 D9 3029 B5 3059 C3 3081 C4 3273 A10 3324 E3 3361 D5 3417 C8 3738 A2 4593 A4 6331 F2
1530 B7 2019 A4 2043 C3 2062 E2 2083 D4 2253 A10 2359 D3 2395 D4 2420 C7 2440 C7 2463 D7 2485 B7 2511 B9 2586 A4 2622 E7 2706 C2 2741 B2 2828 D9 2877 A6 3000 C3 3030 B5 3063 E2 3082 B4 3274 A10 3325 D3 3362 D5 3418 B7 3739 B3 4601 D7 6565 E2
1532 C6 2020 B4 2044 C5 2064 C3 2084 C5 2254 A10 2361 D5 2397 D5 2421 C7 2441 C7 2464 D7 2486 B7 2512 C9 2587 A4 2623 E7 2707 C2 2742 B2 2829 D8 2878 A6 3005 C3 3031 D5 3064 E5 3083 B4 3302 E2 3326 D3 3363 D5 3423 C7 3741 C3 4603 D7 6911 A4
1681 F3 2021 B5 2045 E2 2065 E3 2085 B4 2255 A9 2363 D5 2398 D5 2422 C7 2442 C7 2466 D7 2487 C6 2513 C9 2588 A3 2624 D6 2710 C2 2743 C3 2832 E9 2879 A6 3006 C3 3032 B5 3065 D3 3084 E2 3303 E2 3327 E2 3365 D5 3424 C7 3742 B3 4604 D6 7004 C5
1701 D2 2022 B5 2046 E2 2066 E4 2086 B4 2261 B10 2364 D5 2403 C7 2423 C8 2443 C7 2467 D7 2488 C6 2514 C9 2601 D7 2627 D7 2711 C2 2744 C3 2835 D8 2880 A6 3008 C3 3033 D5 3066 E2 3088 C4 3304 F2 3328 F3 3366 C5 3425 C7 3743 C3 4605 E6 7005 C3
1951 A7 2023 D5 2047 B5 2067 E2 2087 C1 2271 A10 2365 D5 2404 C7 2424 C8 2444 C7 2468 C7 2490 D7 2515 C9 2607 D6 2628 E7 2712 B3 2746 B2 2836 D8 2881 A6 3009 D4 3034 D5 3067 C1 3089 B3 3305 F3 3329 F3 3367 C5 3426 C6 3744 D2 4606 E6 7011 C4
2000 C3 2025 D5 2048 E2 2068 C3 2088 C1 2302 E2 2366 D5 2405 C7 2425 C8 2445 B7 2469 C7 2491 D7 2516 B9 2608 D7 2629 E7 2713 B2 2747 A3 2840 E8 2883 A6 3010 C3 3035 C5 3068 C1 3091 C5 3309 F2 3340 B4 3368 D5 3427 C8 3745 C3 4607 E6 7015 B5
2001 C3 2026 D5 2049 E2 2069 C1 2090 C1 2303 E2 2367 D5 2406 C7 2426 C8 2446 C8 2471 C6 2492 C7 2517 B9 2609 D7 2630 D7 2714 A2 2748 A3 2841 D8 2884 A6 3012 D5 3036 D5 3069 C1 3092 B5 3311 F2 3342 B4 3369 D5 3428 C6 3746 C3 4608 E7 7016 B4
2003 E2 2028 B4 2050 E2 2070 C4 2091 D1 2307 E2 2368 D5 2407 C7 2427 C8 2447 C7 2472 C6 2493 C8 2526 B9 2610 E7 2631 D7 2715 C2 2749 A3 2842 D8 2885 A7 3013 D5 3037 D1 3070 B4 3093 C5 3313 E3 3343 B4 3370 D3 3429 C6 3747 C3 4701 D2 7017 B5
2004 C3 2029 D5 2051 B4 2072 C4 2092 D1 2308 E2 2370 D4 2408 C7 2428 C8 2448 C7 2473 C6 2494 D8 2531 C7 2612 D7 2632 D7 2716 D2 2750 A3 2844 D8 2886 A6 3020 B4 3038 C1 3071 E5 3094 C5 3314 D3 3344 B5 3373 D5 3432 C7 3748 C3 4702 D2 7018 B4
2005 C3 2030 C5 2052 C5 2073 B4 2093 D1 2309 E2 2371 D4 2409 C7 2429 C8 2449 C7 2474 C7 2496 D7 2532 C6 2613 D7 2633 E7 2718 B3 2811 E8 2845 D8 2887 A6 3021 B4 3039 B4 3072 C1 3096 C4 3315 E3 3345 B5 3389 C5 3433 C7 3749 C3 4703 C1 7019 B5
3436 B7 3750 C3 4704 D2 7070 B3
3437 B7 3751 D2 4705 D2 7075 B4
3438 B7 3752 A3 4706 C2 7099 B4
3439 C6 3753 A3 4707 C2 7260 B10
3440 B6 3808 E9 4708 C4 7271 A10
3442 D7 3809 D9 4709 B4 7272 A10
3443 D7 3810 E9 4710 C2 7316 D3
3444 C8 3815 D8 4711 C2 7320 D2
3446 D7 3816 D8 4716 B4 7325 D2
3448 C7 3817 D8 4720 A1 7360 D5
3449 C7 3819 D9 4836 E8 7416 B7
3460 B7 3822 D9 4838 D8 7531 C7
3501 B9 3823 D9 4871 B8 7532 C6
3502 B9 3827 D8 4872 B8 7579 E2
3503 B9 3828 E9 4887 A6 7580 B3
3531 C7 3832 E9 4888 B8 7581 B4
3532 C6 3836 E8 5001 C3 7582 B3
3533 C6 3838 E8 5002 C3 7583 A3
3534 C6 3876 A6 5007 C5 7584 A4
3536 B7 3877 A6 5008 C5 7585 A4
3538 A6 3879 A6 5010 C5 7601 D7
3539 B6 3883 A6 5060 C3 7606 D7
3540 B6 3885 A6 5066 E2 7607 D6
3541 B6 3886 A6 5067 E2 7702 D2
3542 B6 3887 A6 5070 B4 7703 C3
3543 B6 3910 A4 5071 C4 7707 D2
3544 B6 3911 A4 5251 A9 7708 C2
3545 A6 3955 B7 5252 A10 7740 C3
3546 A6 3958 B7 5257 A9 7801 D9
3547 A6 4002 D4 5258 A9 7806 D9
3548 A6 4004 D4 5259 A9 7807 D9
3549 A6 4005 D4 5304 F3 7809 D8
3550 A6 4006 D4 5309 E2 7810 D9
3551 A6 4007 D4 5321 E2 7872 B8
3552 A6 4008 C5 5324 E3 7887 A6
3553 A6 4011 D5 5339 D3 7910 A4
3579 E2 4012 D5 5340 D3 7920 B5
3580 A4 4015 B5 5360 C5 7953 A8
3581 A4 4016 B5 5370 C5 7954 B7
3601 D7 4017 E2 5371 C5 7955 B7
3612 D7 4018 E2 5372 C5 7992 B9
3613 D7 4019 E2 5580 A4 7995 D9
3614 D7 4020 E2 5601 D7
3615 D7 4022 E2 5607 D6
3616 D7 4023 E3 5720 A2
3617 E7 4085 C1 5721 A3
3618 E7 4086 D2 5722 A3
3619 D7 4251 A10 5735 B1
3620 D6 4255 A9 5736 B1
3625 E7 4312 E3 5803 E8
3626 E7 4313 E3 5872 B8
3627 E7 4318 D3 5910 A5
3628 E7 4327 D3 5920 A5
3629 D7 4328 D3 5932 B4
3630 D7 4329 E2 5955 B7
3631 E7 4330 D2 5956 B7
3632 E7 4331 D2 5957 B8
3633 E7 4332 E3 5959 B8
3641 D6 4333 E3 5960 B7
3642 D6 4334 E3 5984 C6
3643 E6 4335 E3 5985 D6
3644 E6 4336 E3 5986 C7
3645 D6 4337 D3 5987 C7
3646 D6 4338 D3 5988 C7
3703 D2 4339 F2 5989 C7
3705 D2 4340 F2 5990 C7
3706 C3 4360 D5 5991 B7
3707 C2 4361 D5 5994 B9
3708 D2 4362 C5 5996 D7
3709 C2 4363 C5 5997 C7
3710 D2 4427 C8 5998 C7
3711 C2 4428 C8 6001 B3
3714 B3 4444 C8 6020 B4
3715 B3 4445 C8 6021 B5
3716 C2 4446 C7 6073 B4
3717 D2 4580 B4 6074 B4
3718 C2 4581 B4 6075 B4
3719 D2 4582 B4 6076 B4
3720 D2 4583 B4 6259 B10
3721 C2 4584 B4 6262 B10
3722 D2 4585 B4 6270 A10



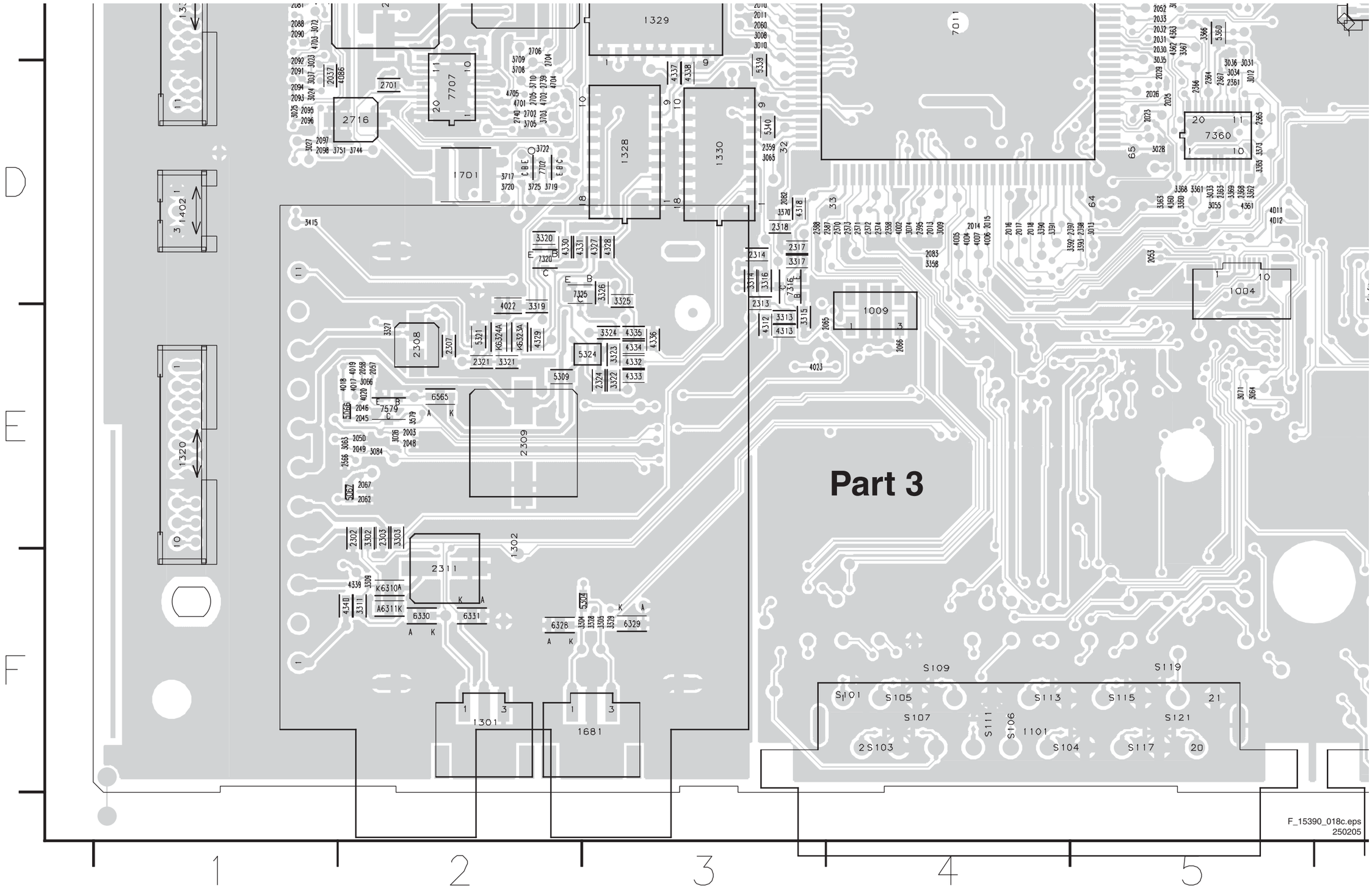
Layout TV & Scaler Board (Top Side Part 1)



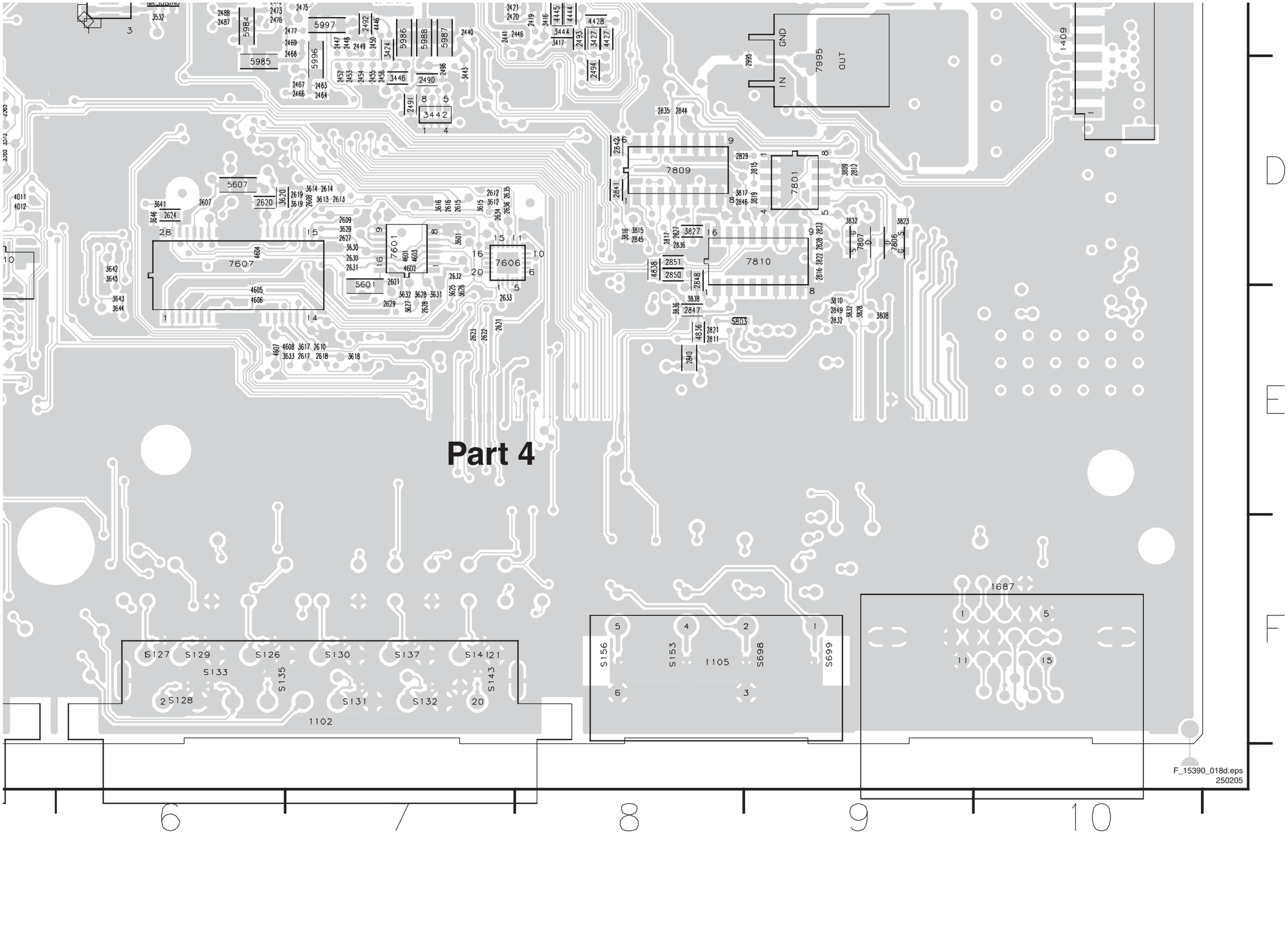
Layout TV & Scaler Board (Top Side Part 2)



Layout TV & Scaler Board (Top Side Part 3)



Layout TV & Scaler Board (Top Side Part 4)



Layout TV & Scaler Board (Bottom Side Overview)

1001 C7 1002 E6 1008 D6 1036 C9 1101 F7 1102 F4 1105 F3 1251 A1 1252 A2 1302 E9
1305 E7 1320 E10 1336 C10 1401 C5 1402 D10 1403 A7 1450 A4 1687 F1 1702 A9 1735 B10
1752 A8 1860 A4 1861 A4 1862 A4 1863 A4 1864 A4 2002 D6 2006 C7 2007 C7 2008 C7
2009 C7 2012 A8 2024 B8 2027 D7 2035 C7 2040 C6 2061 D7 2063 D7 2071 C8 2089 D6
2101 F7 2103 F7 2104 F8 2105 F7 2107 F8 2108 F8 2109 F7 2110 F8 2111 F7 2112 F8
2127 F5 2128 F5 2129 F5 2131 F4 2132 F5 2133 F5 2134 F5 2135 F5 2136 F5 2137 F5
2138 F3 2139 F6 2140 F6 2152 F2 2153 F2 2155 F3 2157 F3 2169 F4 2262 A1 2263 D1
2264 D1 2265 E1 2266 E1 2268 C1 2269 B1 2355 D7 2356 D7 2357 D7 2360 C6 2375 D7
2376 B7 2377 B7 2380 C6 2382 C8 2386 B7 2392 B7 2396 D7 2401 D5 2402 C5 2417 B3
2418 B3 2434 B4 2435 D4 2451 D4 2465 D5 2470 D5 2478 B4 2482 B4 2495 D4 2501 C2
2502 C2 2530 B5 2560 D7 2561 D6 2562 D6 2563 C6 2564 D7 2565 A9 2605 E4 2606 D4
2611 D5 2625 E5 2626 E5 2681 E2 2686 E2 2688 F2 2693 F2 2698 F3 2699 F3 2708 B7
2709 D9 2784 F1 2785 F1 2803 E2 2806 E3 2807 E2 2808 E3 2809 E2 2810 D2 2813 E3
2814 E3 2818 D2 2819 E3 2820 E2 2824 D2 2825 E3 2826 E2 2830 D2 2833 D2 2834 D3
2837 E2 2838 E2 2839 E3 2843 D2 2860 A4 2861 A4 2862 A4 2863 A4 2864 A4 2865 A4
2866 A4 2867 A4 2868 A4 2869 A4 2870 A4 2871 A4 2874 A4 2875 A4 2882 A5 2911 A7
2920 B6 2921 B6 2930 A6 2931 B6 2932 B6 2933 A6 2934 A6 2935 C7 2953 B3 2954 A3
2955 A2 2956 A2 2957 B7 2958 A3 2960 B4 2994 B2 2996 C8 3001 B7 3002 B7 3003 B7
3004 B7 3007 C7 3011 C6 3014 C6 3015 C6 3016 C6 3017 C6 3018 C6 3019 C6
3049 C6 3050 C6 3051 C6 3052 C6 3053 D7 3060 D7 3085 C7 3086 C7 3087 C7 3101 F7
3102 F7 3103 F8 3104 F8 3105 F7 3106 F7 3107 F8 3108 F8 3109 F7 3110 F7 3111 F7
3112 F7 3113 F7 3114 F7 3115 F7 3116 F7 3117 F6 3118 F6 3119 F6 3120 F6 3121 F6
3122 F6 3123 F6 3124 F7 3125 F7 3126 F5 3127 F5 3128 F5 3129 F5 3130 F4 3131 F5
3132 F5 3133 F5 3134 F4 3135 F4 3136 F4 3137 F4 3138 F4 3139 F3 3140 F4 3141 F4
3142 F3 3143 F3 3144 F7 3145 F8 3146 F2 3147 F3 3148 F5 3149 F5 3150 F5 3151 F5
3152 F2 3153 F2 3155 F3 3156 F3 3169 F6 3267 E1 3268 E1 3359 D7 3364 D6
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3412 C3 3413 C3 3414 B3 3441 C5 3447 B3 3560 C6 3561 C6 3562 C6 3563 C7 3564 C7
3565 C6 3566 C6 3567 C7 3568 C7 3569 C7 3570 C7 3605 E4 3606 D4 3607 E4 3608 E4
3609 D4 3610 D4 3621 D3 3622 D3 3623 D4 3624 E4 3634 E4 3635 E4 3638 D5 3639 E5
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3697 F1 3698 F3 3699 F3 3700 F3 3701 A8 3702 A8 3704 A8 3712 B7 3713 B7 3723 A8
3724 A8 3729 B6 3781 F3 3782 F2 3783 F1 3784 F1 3786 E1 3787 F1 3788 F2 3801 D3
3802 D3 3803 D3 3804 D3 3805 D3 3806 D3 3807 D3 3813 D3 3821 E3 3824 D2 3825 D2
3826 D2 3830 D3 3831 E3 3834 E2 3835 D2 3870 A4 3871 A4 3930 B6 3931 B6 3932 B6
3933 A6 3951 A3 3952 A3 3953 A3 3954 A2 4009 D6 4010 D6 4062 D7 4101 F7 4139 F6
4609 E4 4610 E4 4611 E5 4712 A8 4714 A8 4715 B7 5003 C7 5004 D7
5005 D6 5006 C6 5072 C7 5139 F6 5253 A1 5254 A1 5262 B1 5263 C1 5267 C1 5268 B1
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5801 E2 5802 D2 5804 D2 5805 E3 5874 A4 5882 A5 5930 B6 5931 B7 5952 A3 5953 A2
5954 B3 6005 D7 6121 F6 6143 F4 6267 D1 6563 C7 6564 C6 6604 D4 6605 D4 6634 E4
6635 E4 6638 D5 6639 E4 6693 F2 6701 B7 6930 B6 6951 A2 7001 A7 7002 B7 7003 B7
7006 B9 7012 C6 7013 C6 7014 C6 7119 F6 7138 F4 7262 E1 7370 E7 7371 E6 7372 E6
7376 B7 7377 B7 7401 C4 7501 C2 7530 A5 7560 C6 7561 C7 7562 D7 7563 C6 7604 E4
7605 E5 7693 F1 7706 B7 7710 B7 7713 A8 7714 A8 7808 D2 7930 B6 7952 A2

Part 1
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Part 2
F_15390_019b.eps

Part 3
F_15390_019c.eps

Part 4
F_15390_019d.eps

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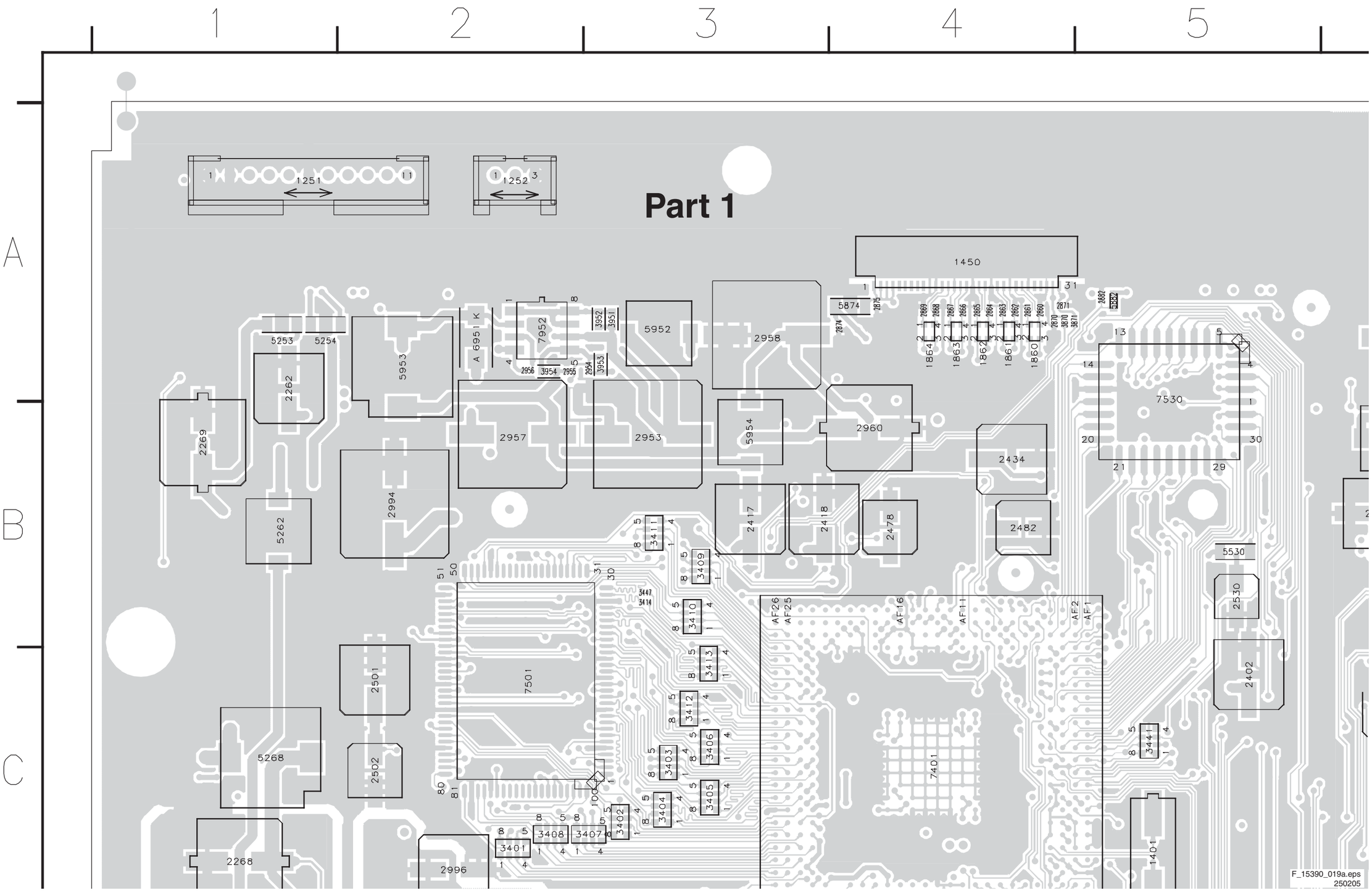
250205

Layout TV & Scaler Board (Bottom Side Part 1)



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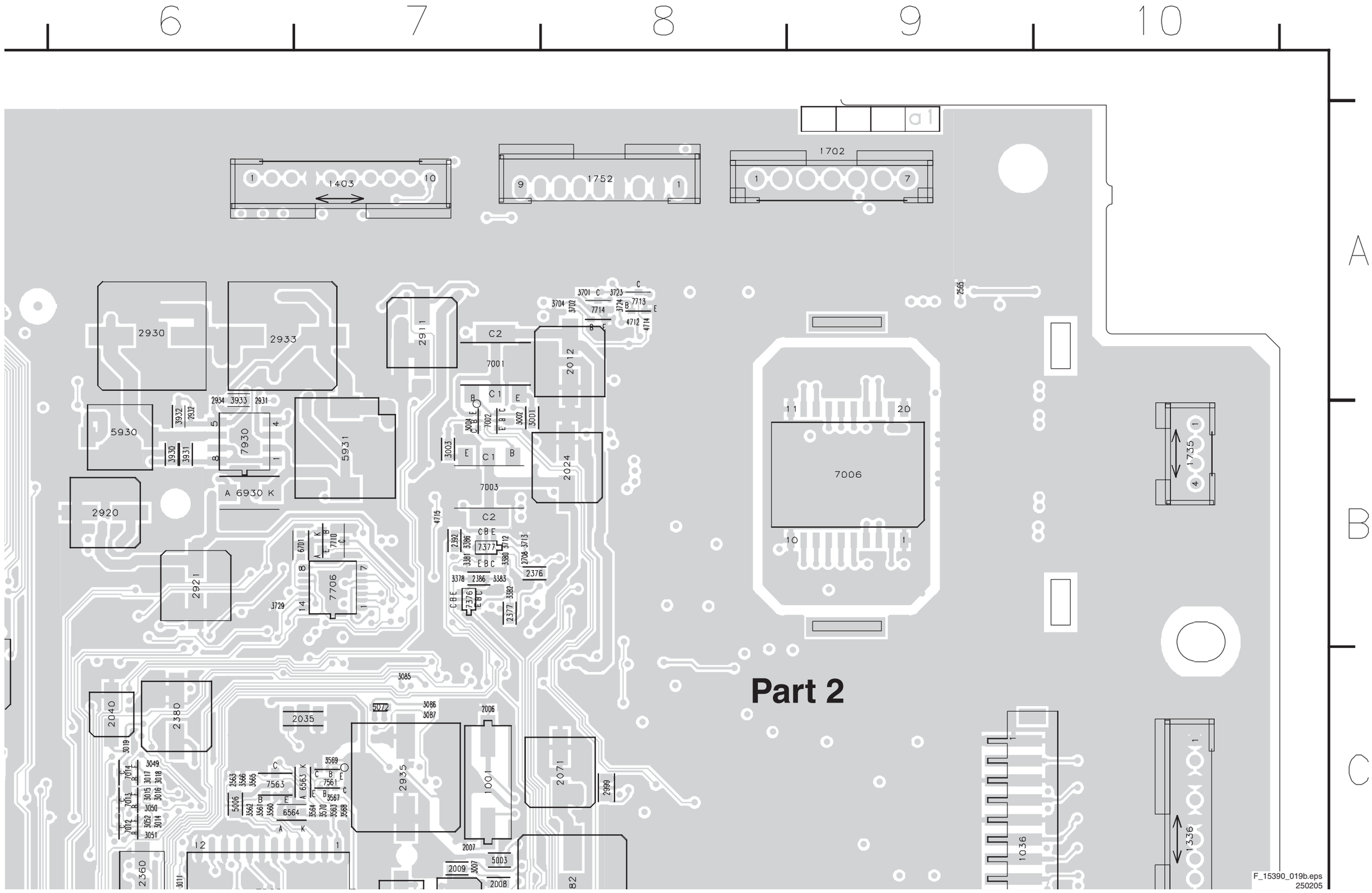

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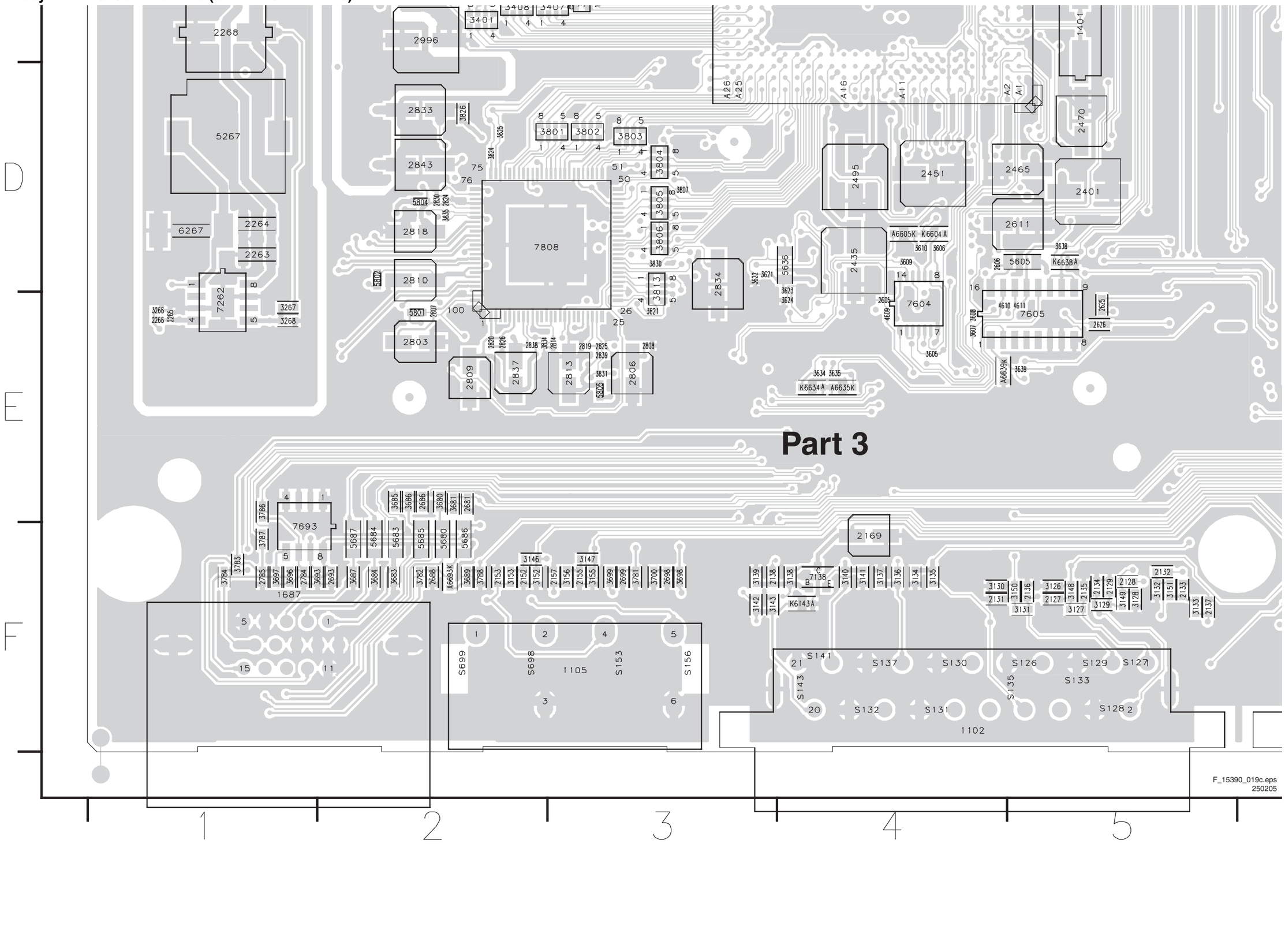
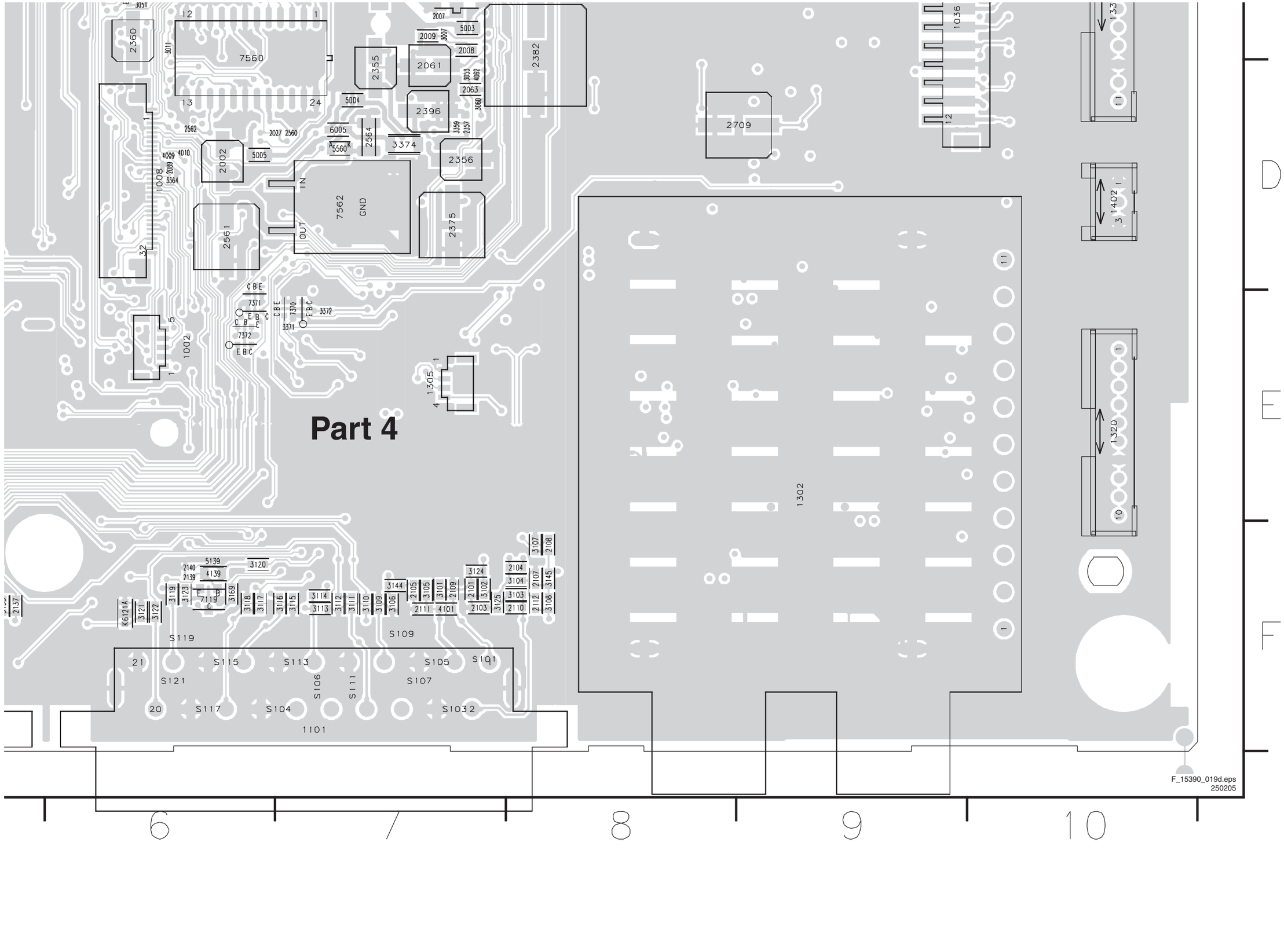


Layout TV & Scaler Board (Bottom Side Part 4)



Class D Audio Amplifier

CLASS D AUDIO AMPLIFIER

POWER LINE FILTER

TO/FROM X200 OF PSU

FROM 1752 OF SSB BOARD A5

PHASE INVERTER (UNITY GAIN)

Speaker Impedance	5006 & 5007	2023 & 2042
4 ohm	22uH	680n
6 ohm Selected	33uH	470n
8 ohm	47uH	330n

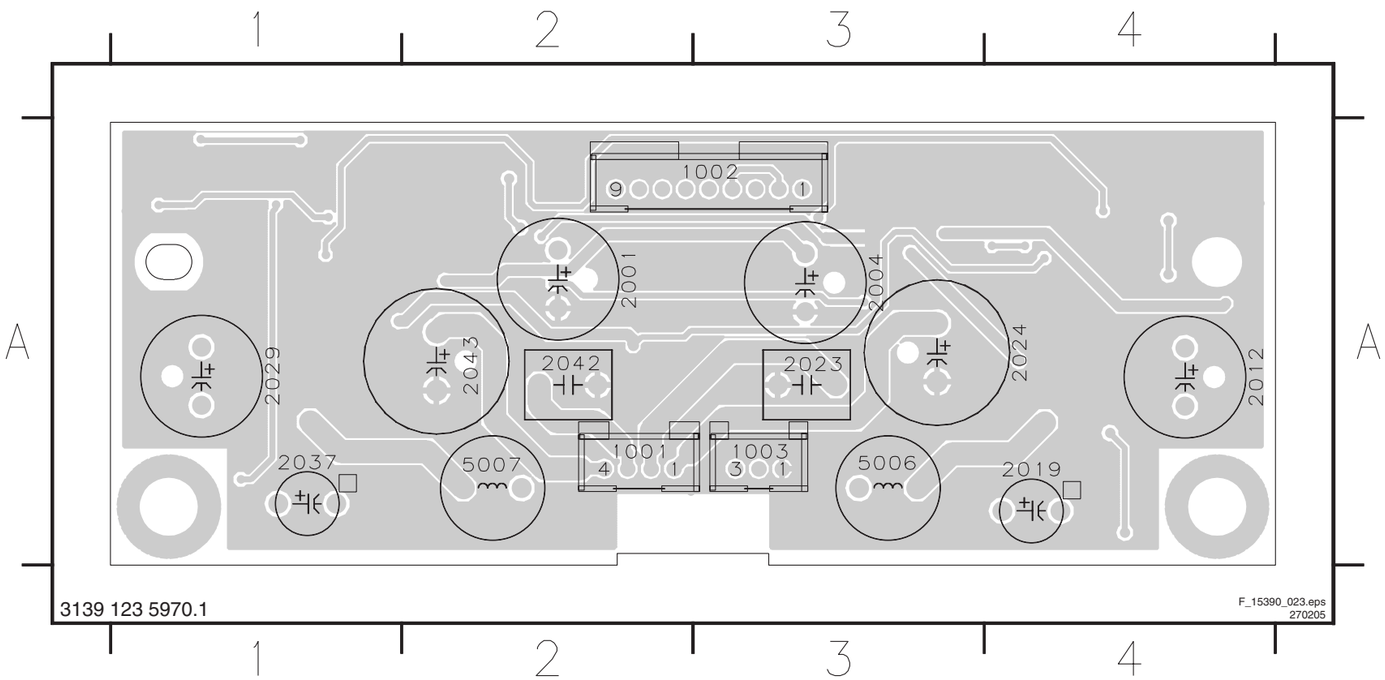
*Connection Inverted (R_CH)

RESERVED

1001 E11	5001 A3	
1002 C2	5002 C3	
1003 A2	5003 C2	
2001 B2	5004 B3	
2002 B3	5005 D3	
2003 B3	5006 C8	
2004 B4	5007 F8	
2006 C3	6001 C4	
2007 C3	6002 C6	
2008 C3	6003 G6	
2009 C3	7000 C6	
2010 C8	7001 F7	
2011 C4	7004 F4	
2012 A5	7005 D4	
2013 B5	F001 A2	
2014 A7	F002 B2	
2015 A6	F003 C2	
2016 A6	F004 C2	
2017 B7	F005 C2	
2018 C8	F006 C2	
2019 C8	F007 A3	
2020 A8	F008 A3	
2021 B8	F009 E11	
2022 C9	F010 E11	
2023 C9	F011 E11	
2024 C9	F012 E11	
2026 C8	I001 B3	
2027 D3	I002 B5	
2028 D3	I003 B5	
2029 F5	I004 C3	
2030 D7	I005 C6	
2031 E6	I006 C6	
2032 F5	I007 C6	
2033 F5	I008 D3	
2034 E7	I009 D4	
2035 E8	I010 D4	
2036 E8	I011 B8	
2037 F8	I012 C7	
2038 F8	I013 C7	
2039 F3	I014 C7	
2040 G8	I015 C7	
2041 F4	I016 F7	
2042 F9	I017 C9	
2043 F9	I019 E4	
2044 G8	I020 F6	
2045 F9	I021 F9	
2047 C5	I022 G4	
2048 B4	I023 F8	
2051 C3	I024 F7	
2052 E10	I025 D6	
2053 E10	I026 G6	
2054 E10	IXXX F3	
2055 E11	IXXX F4	
2060 F11	IXXX F4	
2061 F11	IXXX F5	
2062 B6	IXXX B6	
2063 E6	IXXX B6	
2064 B4	IXXX E6	
2065 F5	IXXX E6	
3001 A3	IXXX A7	
3003 C4	IXXX C7	
3004 B4	IXXX F7	
3005 B7	IXXX F7	
3006 A6	IXXX C8	
3007 B5	IXXX E8	
3008 B5	IXXX F8	
3009 B6		
3010 B8		
3011 C8		
3012 B8		
3013 C5		
3014 C9		
3019 F3		
3020 F5		
3021 G3		
3022 E7		
3023 E6		
3024 F5		
3025 F5		
3026 E8		
3027 E6		
3028 F4		
3029 F8		
3030 E8		
3031 F9		
3032 E6		
3033 F5		
3034 F4		
3037 B6		
3038 C5		
3039 C5		
3040 C9		
3041 F9		
3042 C8		
3043 F8		
3044 D4		
3045 D4		
3046 D6		
3047 G6		
4001 E4		
4003 D4		

Layout Class D Audio Amplifier (Top Side)

1001 A2
1002 A3
1003 A3
2001 A2
2004 A3
2012 A4
2019 A4
2023 A3
2024 A4
2029 A1
2037 A1
2042 A2
2043 A2
5006 A3
5007 A2



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270205

Layout Class D Audio Amplifier (Bottom Side)

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2006 A2
2007 A2
2008 A2
2009 A2
2010 A1
2011 A1
2013 A2
2014 A1
2015 A1
2016 A2
2017 A2
2018 A1
2020 A1
2021 A1
2022 A2
2026 A1
2027 A3
2028 A3
2030 A4
2031 A4
2032 A4
2033 A4
2034 A4
2035 A3
2036 A4
2038 A4
2039 A4
2040 A4
2041 A3
2042 A3
2043 A3
2044 A3
2045 A3
2047 A2
2048 A3
2051 A2
2052 A3
2053 A3
2054 A3
2055 A3
2060 A1
2061 A4
2062 A1
2063 A4
2064 A4
2065 A3
3001 A1
3002 A2
3003 A3
3004 A3
3005 A3
3006 A4
3007 A2
3008 A2
3009 A1
3010 A1
3011 A1
3012 A1
3013 A2
3014 A2
3019 A3
3020 A4
3021 A3
3022 A4
3023 A4
3024 A4
3025 A4
3026 A3
3027 A4
3028 A3
3029 A4
3030 A4
3031 A3
3032 A4
3033 A4
3034 A3
3037 A1
3038 A2
3039 A2
3040 A3
3041 A3
3042 A4
3043 A4
3044 A2
3045 A2
3046 A2
3047 A3
4001 A2
4003 A2
5001 A3
5002 A2
5003 A2
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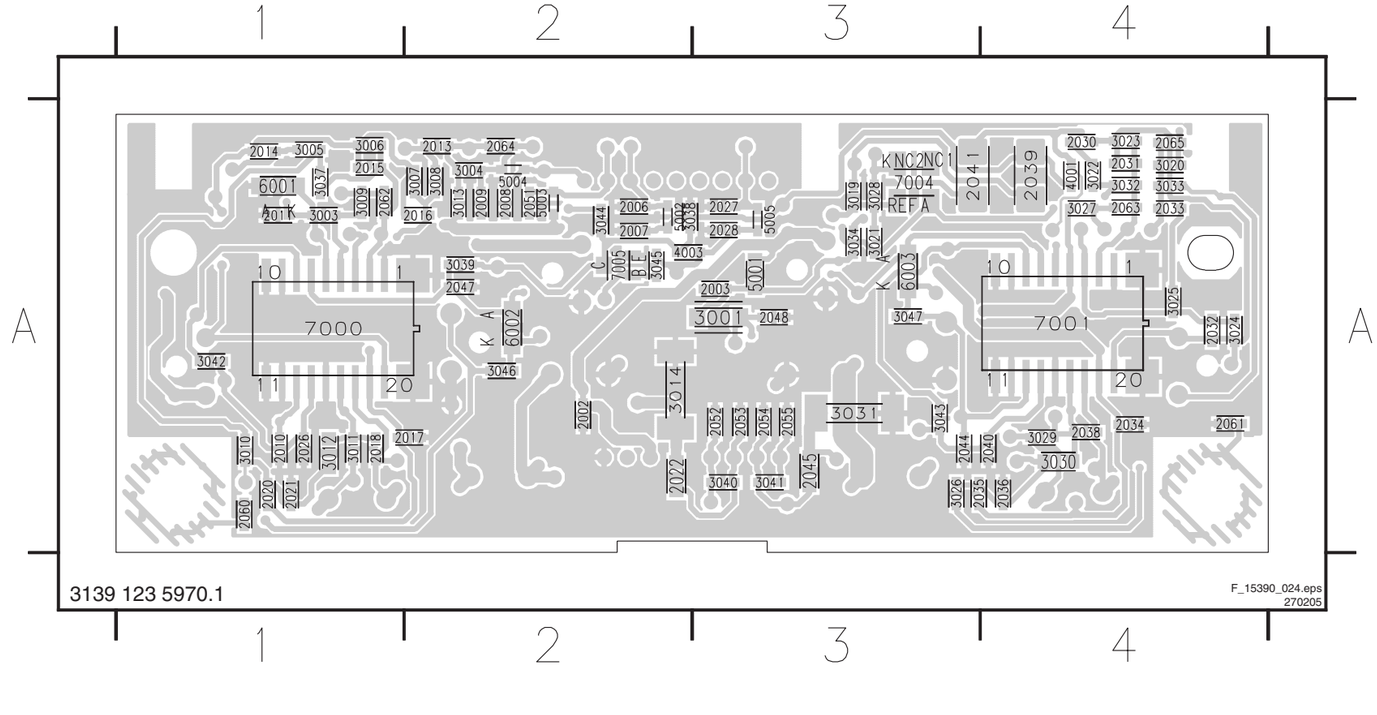
6002 A2
6003 A2
7000 A3
7001 A4
7004 A3
7005 A2



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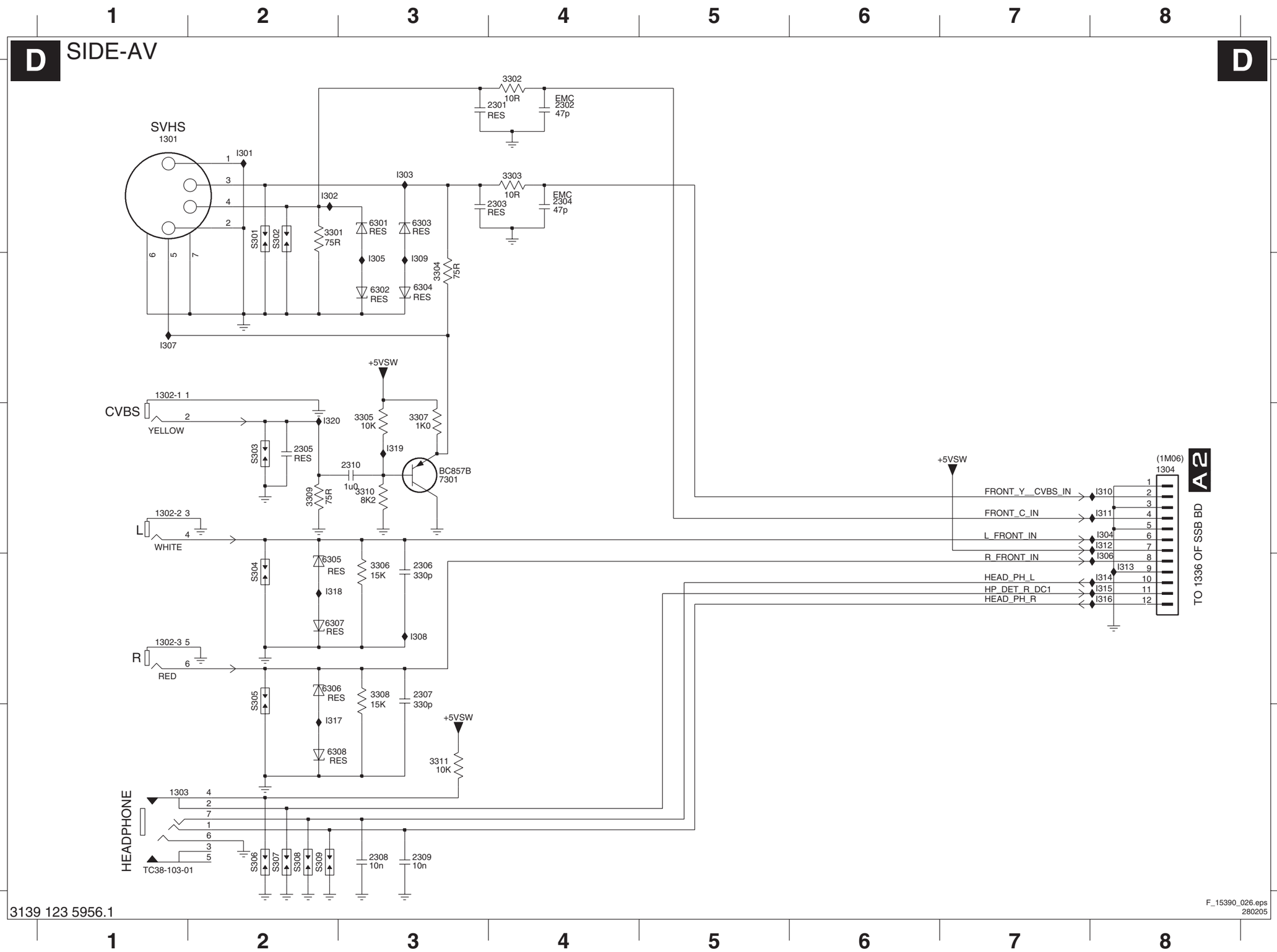
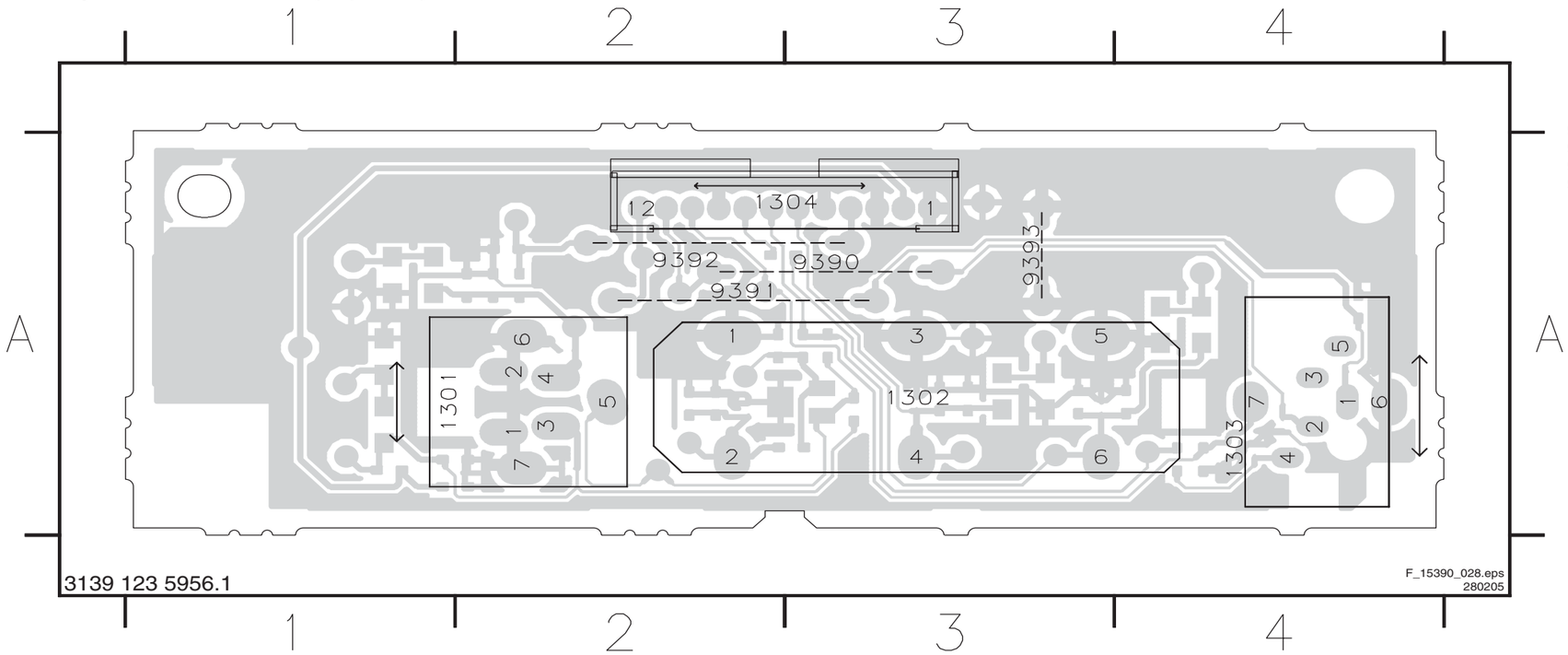
270205

Side A/V Panel



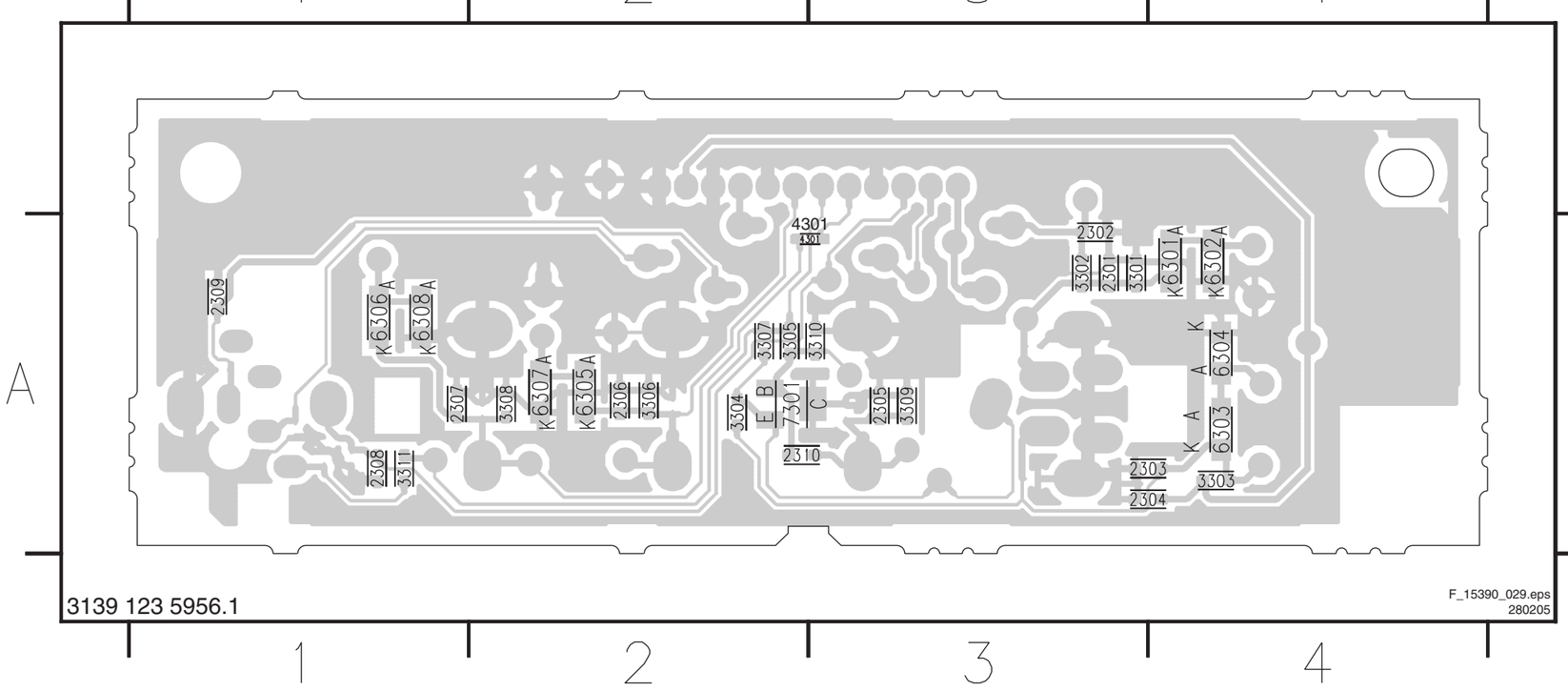
1301 A1
1302-1 B1
1302-2 C1
1302-3 D1
1303 E1
1304 C8
2301 A4
2302 A4
2303 A4
2304 A4
2305 C2
2306 D3
2307 D3
2308 E3
2309 E3
2310 C3
3301 A2
3302 A4
3303 A4
3304 B3
3305 C3
3306 D3
3307 C3
3308 D3
3309 C2
3310 C3
3311 E3
6301 A3
6302 B3
6303 A3
6304 B3
6305 D2
6306 D2
6307 D2
6308 E2
7301 C3
I301 A2
I302 A2
I303 A3
I304 C8
I305 B3
I306 D8
I307 B1
I308 D3
I309 B3
I310 C8
I311 C8
I312 C8
I313 D8
I314 D8
I315 D8
I316 D8
I317 E2
I318 D2
I319 C3
I320 C2
S301 A2
S302 A2
S303 C2
S304 D2
S305 D2
S306 E2
S307 E2
S308 E2
S309 E2

Layout Side A/V Panel (Top Side)



1301 A1
1302 A3
1303 A4
1304 A2
9390 A3
9391 A2
9392 A2
9393 A3

Layout Side A/V Panel (Bottom Side)



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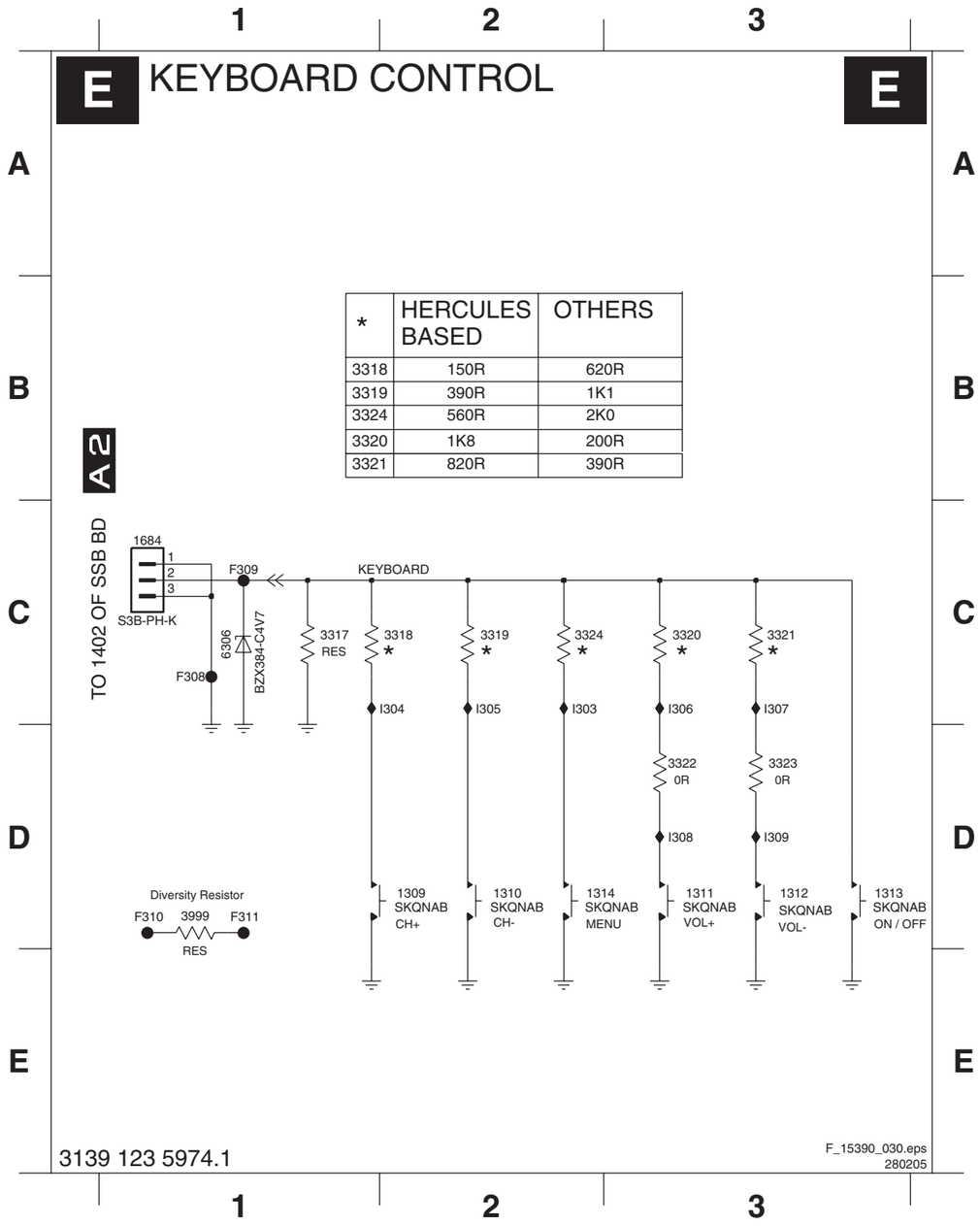
2302 A3
2303 A3
2304 A3
2305 A3
2306 A2
2307 A1
2308 A1
2309 A1
2310 A2
3301 A3
3302 A3
3303 A4
3304 A2
3305 A2
3306 A2
3307 A2
3308 A2
3309 A3
3310 A3
3311 A1
4301 A3
6301 A4
6302 A4
6303 A4
6304 A4
6305 A2
6306 A1
6307 A2
6308 A1
7301 A2

Keyboard Control Panel



*	HERCULES BASED	OTHERS
3318	150R	620R
3319	390R	1K1
3324	560R	2K0
3320	1K8	200R
3321	820R	390R

Personal Notes:

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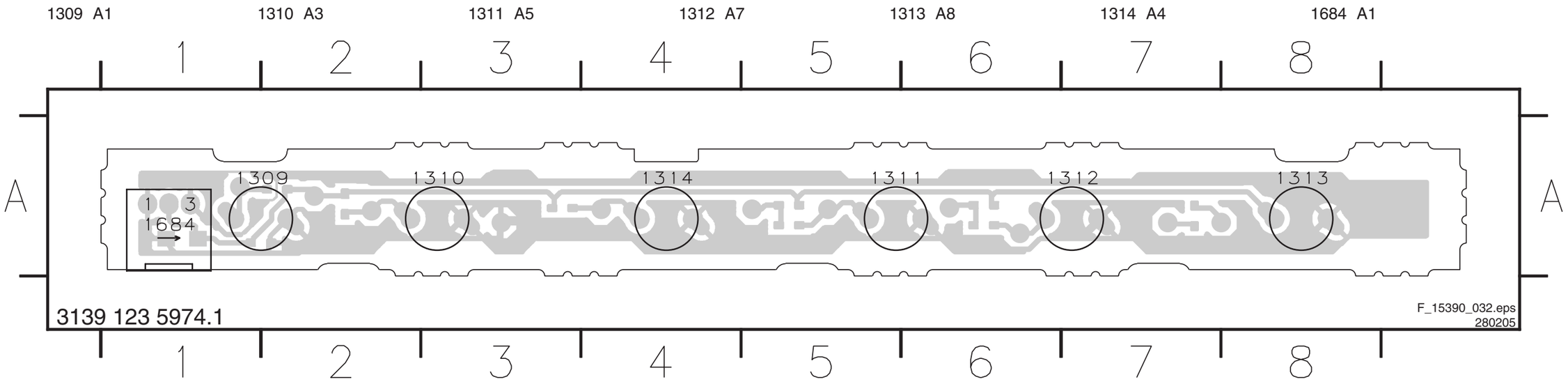
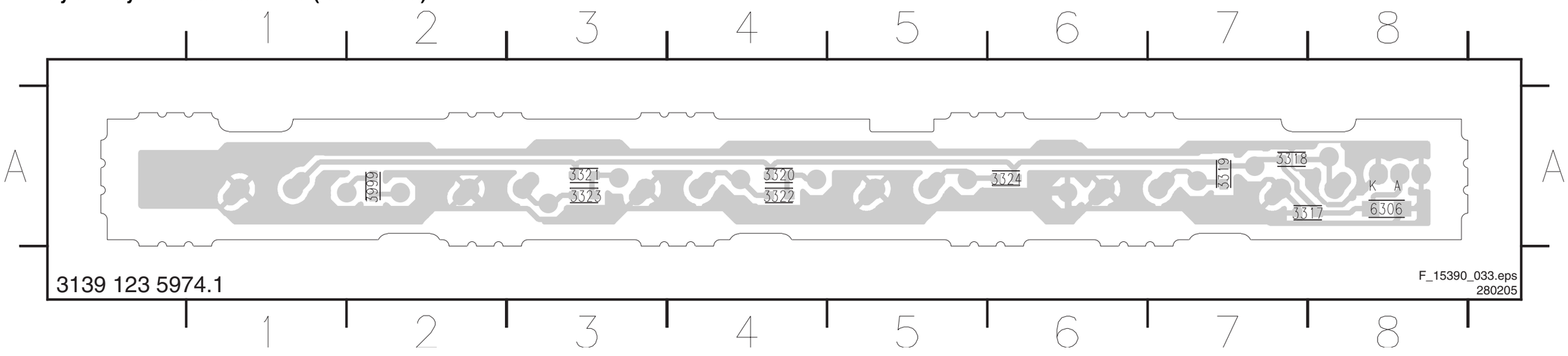
131004

Layout Keyboard Control Panel (Top Side)

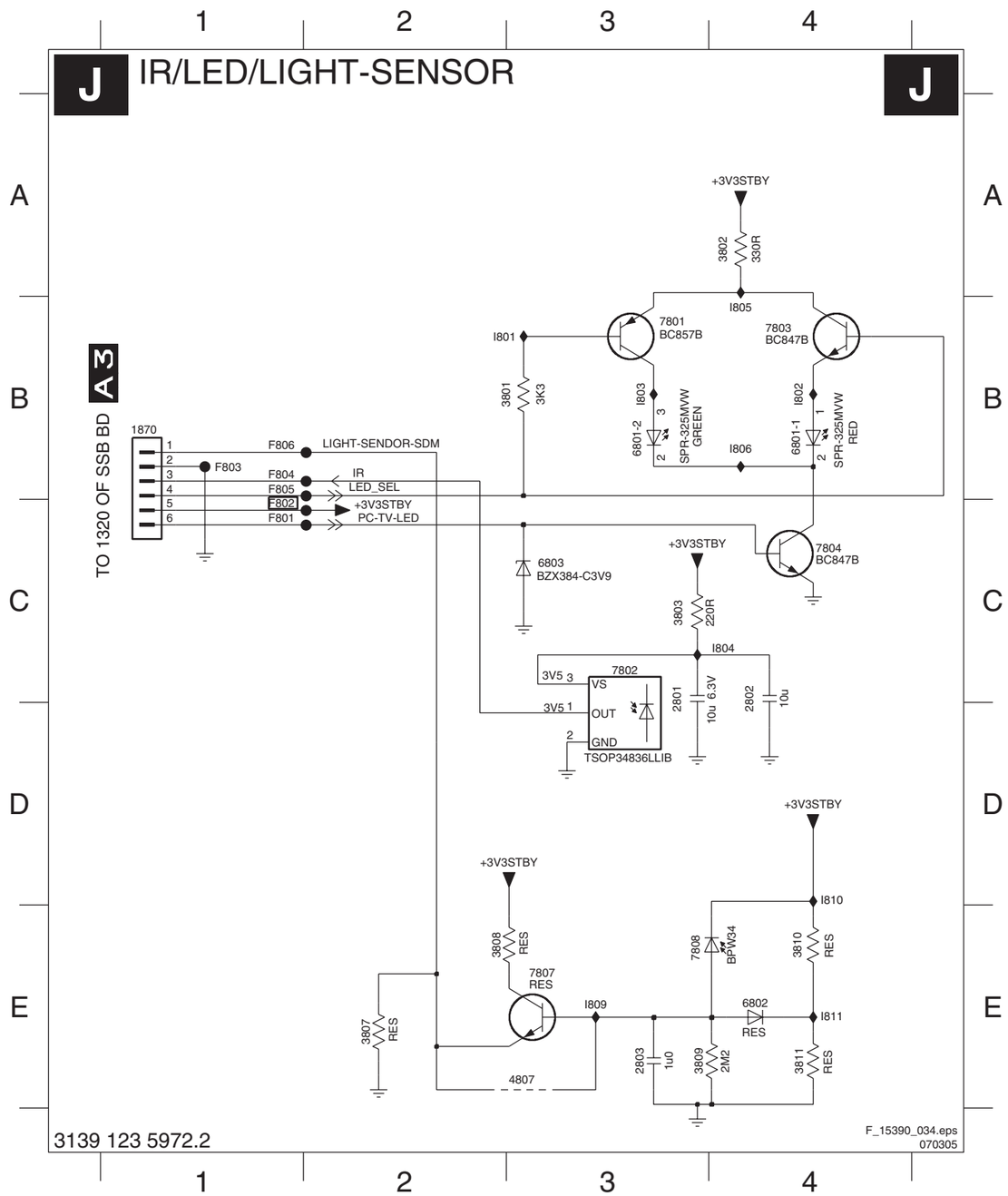


Layout Keyboard Control Panel (BottomSide)



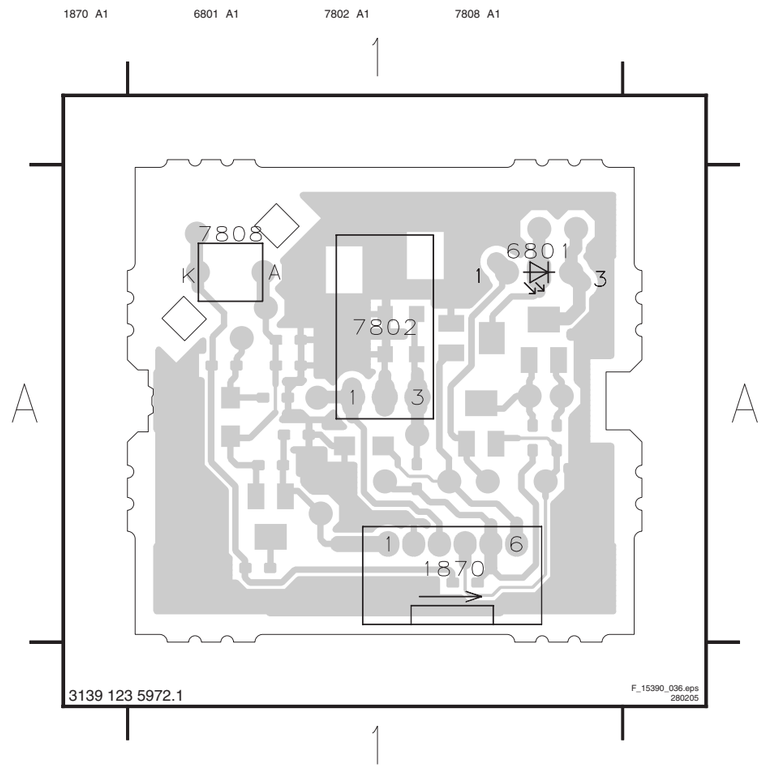
IR-LED and Light Sensor Panel

1870 B1	3801 B2	3808 E2	4807 E3	6803 C3	7804 C4	F802 C1	F806 B1	I804 C4	I810 D4
2801 C3	3802 A4	3809 E3	6801-1 B4	7801 B3	7807 E3	F803 B1	I801 B2	I805 B4	I811 E4
2802 C4	3803 C3	3810 E4	6801-2 B3	7802 C3	7808 E3	F804 B1	I802 B4	I806 B4	
2803 E3	3807 E2	3811 E4	6802 E4	7803 B4	F801 C1	F805 B1	I803 B3	I809 E3	



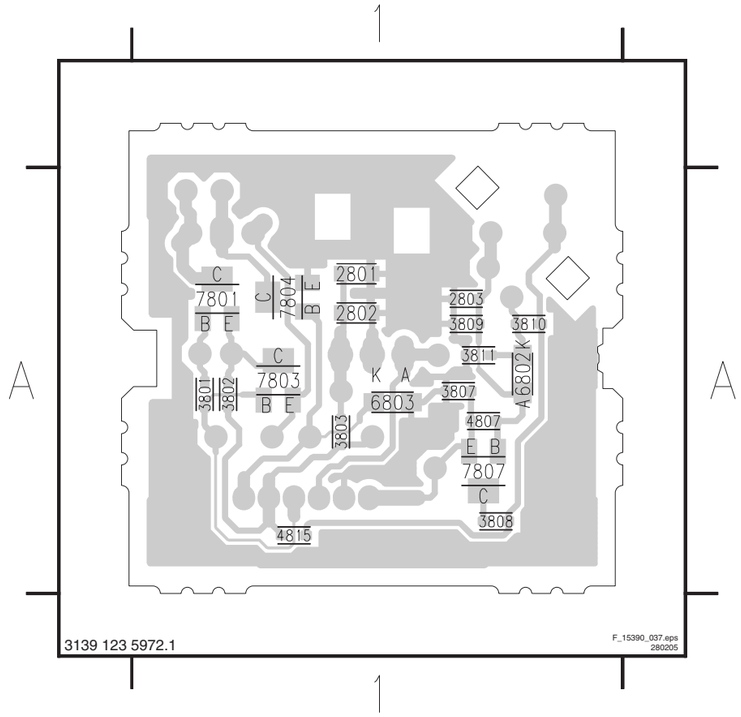
Layout IR-LED and Light Sensor Panel (Top Side)

1870 A1 6801 A1 7802 A1 7808 A1



Layout IR-LED and Light Sensor Panel (Bottom Side)

2801 A1 2803 A1 3802 A1 3807 A1 3809 A1 3811 A1 4815 A1 6803 A1 7803 A1 7807 A1
2802 A1 3801 A1 3803 A1 3808 A1 3810 A1 4807 A1 6802 A1 7801 A1 7804 A1



8. Alignments

Index of this chapter:

Note: The Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5. Menu navigation is done with the CURSOR UP, DOWN, LEFT or RIGHT keys of the remote control transmitter.

8.1 General Alignment Conditions

8.1.1 Start Conditions

Perform all electrical adjustments under the following conditions:
- Power supply voltage (depends on region):
  - AP-NTSC: 120 V_{AC} or 230 V_{AC} / 50 Hz (± 10%).
  - AP-PAL-multi: 120 - 230 V_{AC} / 50 Hz (± 10%).
  - EU: 230 V_{AC} / 50 Hz (± 10%).
  - LATAM-NTSC: 120 - 230 V_{AC} / 50 Hz (± 10%).
  - US: 120 V_{AC} / 60 Hz (± 10%).
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 15 minutes.
- Measure voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply).
  Caution: never use heatsinks as ground.
- Test probe: Ri > 10 Mohm, Ci < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

8.1.2 Initial Settings

Perform all electrical adjustments with the following initial settings:
1. To avoid the working of the light sensor, set "Active Control" to "Off" (via the "Active Control" button on the RC).
2. Set "Smart Picture" to "Natural" or “Soft” (via the "Smart Picture" button on the RC).

8.1.3 Alignment Sequence

- First, set the correct options:
  - In SAM, select OPTIONS,
  - Fill in the option settings according to the set sticker (see also paragraph "Option Settings"),
  - Store the OPTIONS by switching the set to STAND-BY.
- Warming up (>15 minutes).
- White-D alignment.

8.2 Software Alignments

With the software alignments of the Service Alignment Mode (SAM) the geometry, white tone and tuner (IF) can be aligned. To store the data: Use the RC button Menu to switch to the main menu and next, switch to ‘Stand-by’ mode.

For the next alignments, supply the following test signals via a video generator to the RF input:
- **EU/AP-PAL** models: a PAL B/G TV-signal with a signal strength of at least 1 mV and a frequency of 475.25 MHz
- **US/AP-NTSC** models: an NTSC M/N TV-signal with a signal strength of at least 1 mV and a frequency of 61.25 MHz (channel 3).

8.2.1 SAM Menu

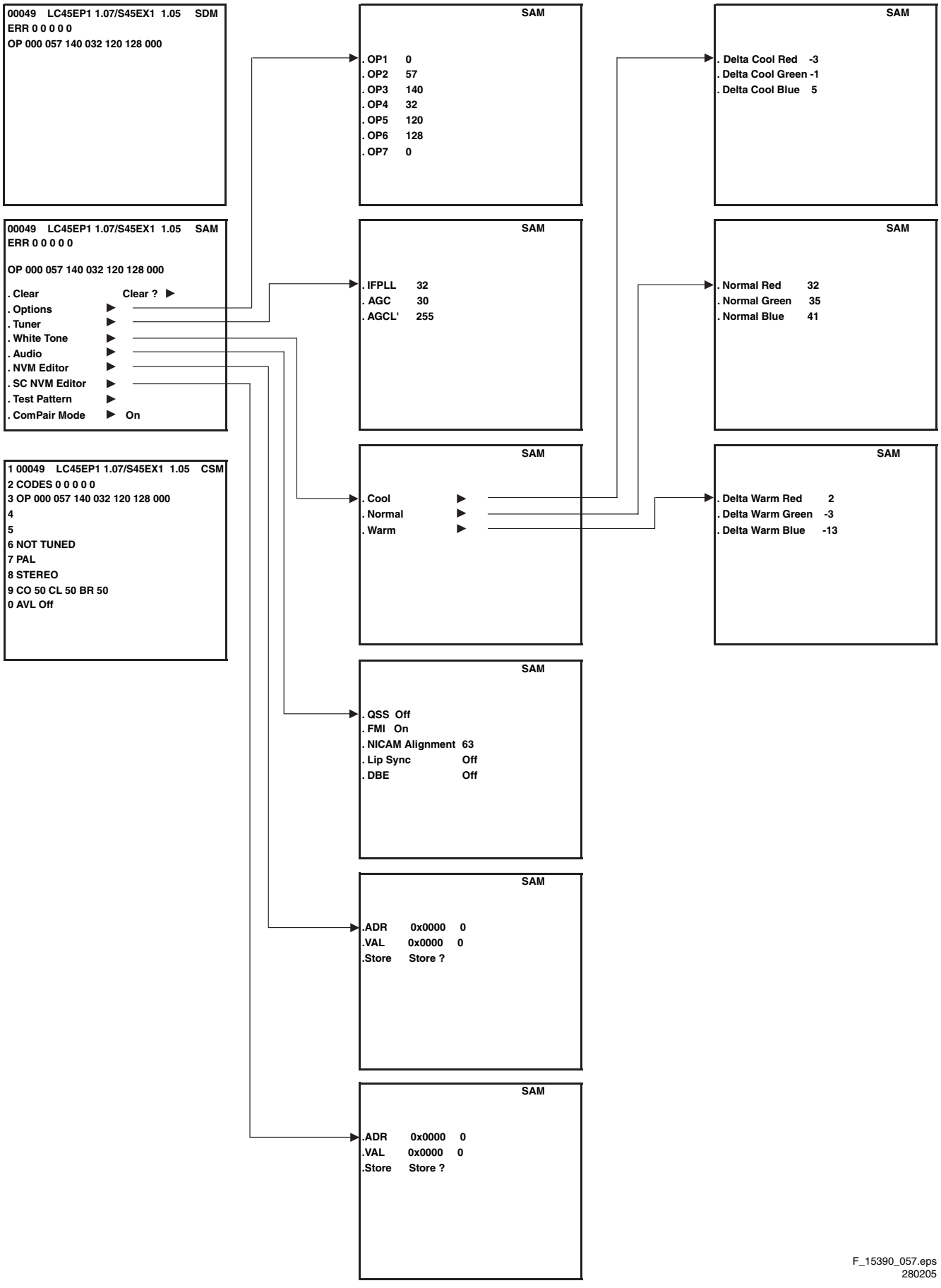


Figure 8-1 Overview SAM menu.

8.2.2 White Tone

Method 1 (with colour analyser):

1. Supply a 100% white uniformity test signal (100 IRE white) to the tuner.
2. Enter SAM menu (colour features are switched “off” automatically).
3. Do NOT change the SMART PICTURE, ACTIVE CONTROL, and CONTRAST+ settings to prevent activating of Green Enhancement, Blue Stretch, and Black Stretch.

Offset values in NVM are used for HD-, HDMI-, and VGA mode, therefore only the settings in TV mode need to be set.

Make the following settings in the normal **user menu**, when the television is in TV Mode:

Table 8-1 User menu settings for White Tone alignment

	LCD (AUO)	LCD (LPL)
CONTRAST	99	
BRIGHTNESS	42 (EU) 44 (US)	46
COLOR/SAT.	50 (AP+LA+US) 60 (EU)	

Go to WHITE TONE in SAM and set NORMAL GREEN to:

Table 8-2 Service menu settings for White Tone alignment

	LCD (AUO)	LCD (LPL)	Plasma (SDI)
NORM. GREEN	200		180

1. Measure with a calibrated (phosphor- independent) colour analyser (e.g. Minolta CA-200) in the centre of the screen (use a contactless analyser, e.g. Minolta CA-210, to align the LCD TV). The analyser may not touch the screen, and the measurement must be done in a dark environment.
   Note: The colour analyser must be calibrated for the LCD or Plasma panel in question. See the manual of the colour analyser for the procedure on how to perform this calibration.
2. Leave the value with the lowest output on the initial value.
3. Align the NORMAL white points, by lowering the other two colours, to the right x-y coordinates (see table "White Tone alignment values").
   Note: To prevent clipping of the colour, these values must only be lowered!

Table 8-3 White Tone alignment values

	NORMAL colour temp. (all regions)
X	0.289
Y	0.299

Only the values for NORMAL are aligned with X, Y values. The delta values for COOL and WARM are given below.

Table 8-4 Fixed delta values

Screen Type	Colour temp.	RED	GREEN	BLUE
LCD (AUO)	DELTA COOL	-3	-12	+10
	DELTA WARM	+5	-5	-20
LCD (LPL)	DELTA COOL	-8	-12	+3
	DELTA WARM	+2	-10	-21

After the alignment is finished, switch the set to STANDBY, in order to store the alignments.
Note: When you disconnect the power before you have switched the set to STANDBY, the settings will not be stored.

Method 2 (without colour analyser):

If you do not have a colour analyser, you can use the default values. These values are based on the average values in production.

- Set the values for the NORMAL colour temperature. Given in the table “Average statistical values for NORMAL” from production.
- Set the delta values for the COOL and WARM mode. See table: “Fixed delta values.”

After the alignment is finished, switch the set to STANDBY, in order to store the alignments.
Note: When you disconnect the power before you have switched the set to STANDBY, the settings will not be stored.

Table 8-5 Average statistical values for “NORMAL”

Display type	Colour Temp.	RED	GREEN	BLUE
LCD (AUO)	NORMAL	165	182	200
LCD (LPL)	NORMAL	200	195	190
Note: Values are valid for all regions				

8.2.3 Tuner Adjustment

AGC (RF AGC Take Over Point)

Set the pattern generator (e.g. PM5580) on the colour bar pattern and connect it to the aerial input with an RF signal amplitude of 10 mV and set the frequency for NTSC to 61.25 MHz (channel 3).

- Activate the SAM-menu. Go to the sub-menu TUNER, select the sub-menu option AFC WINDOW and adjust the value to “100 kHz”.
- Select the AGC sub-menu.
- Connect a DC multi-meter to test point F306 or pin 1 of the tuner.
- Adjust the AGC until the voltage at pin 1 of the tuner is 3.3 V +0.5 / -1.0.
- The value can be increased or decreased by pressing the RIGHT/LEFT cursor button on the RC.
- Switch the set to STAND-BY to store the data.

8.2.4 Grey Scale Adjustment

SDTV Grey Scale Adjustment

Equipment and Setting
- E.g. Fluke 54200 or Philips PM5580.
- 100% “8-step grey scale” pattern.

Alignment Method
- Switch the TV set with the RC to TV mode,
- Press the MUTE button on the RC,
- Set SMART PICTURE to SOFT mode,
- Activate the auto colour function by pressing key-sequence: INFO - MUTE - MUTE - MUTE - INFO - MENU - INFO.

Expected Results
- Visual check if the 8 Grey levels are correct.

Analog PC Grey Scale Adjustment

Equipment and Setting
- Quantum Data 802B.
- PC input signal, with 64 levels Grey scale pattern, 1024x768 @ 60 Hz (Format= 81:DMT1060, Pattern= 123:Grey 64).
- PC input at D-sub VGA connector.

Alignment Method
- Switch the TV set with the RC to PC mode.
- Press the MUTE button on the RC.
- Set BRIGHTNESS and CONTRAST to nominal “50”.
- Activate the auto colour function by pressing key-sequence: INFO - MUTE - MUTE - MUTE - INFO - MENU - INFO.

Expected Results
- Visual check if the 64 Grey levels are correct.

HD Grey Scale Adjustment

Equipment and Setting
- Quantum Data 802B.
- HD input signal, Top half 100% colour bar and bottom half Grey scale pattern, 1920x1080i @ 60 Hz YPbPr (Format= 1080i30, Pattern= HDBar100).
- HD input at D-sub VGA connector.

Alignment Method
- Switch the TV set with the RC to HD mode.
- Press the MUTE button on the RC.
- Activate the auto colour function by pressing key-sequence: INFO - MUTE - MUTE - MUTE - INFO - MENU - INFO.

Expected Results
- Visual check if Colour bar tint and Grey scale are correct.

8.2.5 Sound

No adjustments are needed for the sound.

8.3 Option Settings

Options are used to control the presence/absence of certain features and hardware.
See, for an overview, the table on the next page.

8.3.1 How to Change an Option Byte

An Option Byte represents a number of different options. Changing these bytes directly makes it possible to set all options very fast. All options are controlled via seven option bytes. Select the option byte (OP1.. OP7) with the cursor UP/ DOWN keys, and enter the new value.

Leaving the OPTION sub menu saves the changes in the Option Byte settings. Some changes will only take effect after the set has been switched “off” and “on” with the AC power switch (cold start).

Table 8-6 Option codes (general overview for all regions and displays)

Bit (DEC)	Option	Description	/10, /12 (Europe)	Remarks
7 (128)	OP_PHILIPS_TUNER	Philips Tuner available	1	
6 (64)	OP_FM_RADIO	FM Radio available	0	
5 (32)	OP_LNA	Low Noise Amplifier available	0	
4 (16)	OP_ATS	Auto Tuning System	0	
3 (8)	OP_ACI	ACI	1	
2 (4)	OP_UK_PNP	After virgin = English + Great Britain	0	
1 (2)	OP_VIRGIN_MODE	Activate Plug & Play menu at start-up	0	
0 (1)	OP_CHINA	AP-PAL tuning algorithm for China	0	
OP1:			**136**	
7 (128)	OP_SMART_SOUND	Four smart sound settings	1	
6 (64)	OP_UI_GREEN	UI for Magnavox sets (NAFTA)	0	
5 (32)	OP_CHANNEL_NAMING	Naming of channel feature available	0	
4 (16)	OP_LTI	Histogr. algorithm available (TDA9178)	1	
3 (8)	OP_TILT	Picture Rotation available	0	
2 (4)	OP_FINE_TUNING	Fine Tuning algorithm available	1	
1 (2)	OP_PIP_PHILIPS_TUNER	PIP Philips tuner	0	
0 (1)	OP_HUE	Tint for NTSC transmission	0	
OP2:			**148**	
7 (128)	OP_EW_FUNCTION	Geometry adj. for Large screen sets	0	
6 (64)	OP_2TUNER_PIP	Double Tuner for PIP available	0	
5 (32)	OP_PIP_SPLITTER	Not used	0	
4 (16)	OP_SPLITTER	Not used	0	
3 (8)	OP_VIRTUAL_DOLBY	Virtual Dolby Effect	1	
2 (4)	OP_WIDE_SCREEN	16:9 sets	1	
1 (2)	OP_WSSB	Wide Screen Signalling Bit detection	1	
0 (1)	OP_ECO_SUBWOOFER	Sub woofer available	0	
OP3:			**14**	
7 (128)	OP_LIP_SYNC	Lip Synchronisation Circuit available	0	
6 (64)	OP_NOTUSED2	Not used	0	
5 (32)	OP_ULTRA_BASS	Ultra Bass Boost available	0	
4 (16)	OP_DELTA_VOLUME	Delta Volume feature available	1	EU only
3 (8)	OP_NOTUSED3	Not used	0	
2 (4)	OP_NOTUSED4	Not used	0	
1 (2)	OP_STEREO_DBX	Stereo DBX for NTSC available	0	NTSC only
0 (1)	OP_STEREO_NICAM_2CS	Stereo NICAM 2CS available	1	
OP4:			**17**	
7 (128)	OP_AV1	External Source 1 available	1	
6 (64)	OP_AV2	External Source 2 available	1	
5 (32)	OP_AV3	External Source 3 (Side AV) available	1	
4 (16)	OP_CVI	Component Video In available	0	Not for EU
3 (8)	OP_SVHS2	Super Video Home System 2 available	1	
2 (4)	OP_SVHS3	Super Video Home System 3 available	1	
1 (2)	OP_HOTEL_MODE	LATAM specific simplified Hotel Mode	0	
0 (1)	OP_NOTUSED	Not used	0	
OP5:			**236**	
7 (128)	OP_PERSONAL_ZAPPING	Zapping of channels feature available	0	
6 (64)	OP_SMART_SURF	Surf List available	0	
5 (32)	OP_FMTRAP	FM trap available	0	
4 (16)	OP_COMBFILTER	comb filter available	1	In Hercules
3 (8)	OP_ACTIVE_CONTROL	Auto Picture Impr. feature available	1	
2 (4)	OP_SMART_LOCK	Toggle Child Lock & Lock Chan. enabled	1	
1 (2)	OP_LIGHT_SENSOR	Light Sensor enabled	1	
0 (1)	OP_TWIN_TEXT	2 txt pages on screen available	1	
OP6:			**31**	
7 (128)	OP_TIME_WIN1	1= 5 s, 0= 2 s (Europe fixed 1.2 s)	0	
5, 6	not used		0	
4 (16)	OP_3DCOMB	3D comb filter available	0	NTSC only
<EUROPE>				
3 (8)	OP_DUMMY6	Not used	0	
2 (4)	OP_DUMMY7	Not used	0	
1 (2)	OP_WEST_EU	West Europe Set (0 - East Europe Set) by default "on"	1	
0 (1)	OP_MULTI_STANDARD_EUR	For Europe multi standard set	1	
0 (1)	OP_DUMMY9	Not used	0	
OP7:			**3**	

9. Circuit Descriptions, Abbreviation List, and IC Data Sheets

Index of this chapter:

9.1 Introduction

The LC4.5 LCD TV is a global LCD TV for the year 2005. It is the successor of the LC04 LCD TV and covers screens size 30 inch (in 15:9 ratio) and has a new styling, called ME5.
This chassis has the following (new) features:

- **Audio**: The sound processor is part of the UOC processor (called “Hercules”). The chassis has a FM Radio with 40 preset channels.
- **Video**: Enhanced video features, video drivers, Active Control and multiple PIP.

The architecture consists of a TV and Scaler panel, I/O panel, Side I/O and Local Keyboard panel and Power Supply panel. The functions for video/audio processing, microprocessor (uP), and CC/Teletext (TXT) decoder are all combined in one IC (TDA120xx, item 7011), the so-called third generation Ultimate One Chip (UOC-III) or “Hercules”. This chip has the following features:

- Control, small signal, mono/stereo, and extensive Audio/ Video switching in one IC.
- Upgrade with digital sound & video processing.
- Alignment free IF, including SECAM-L/L1 and AM.
- FM sound 4.5/5.5/6.0/6.5, no traps/bandpass filters.
- Full multi-standard colour decoder.
- One Xtal reference for all functions (microprocessor, RCP, TXT/CC, RDS, colour decoder, and stereo sound processor).

9.2 Block Diagram

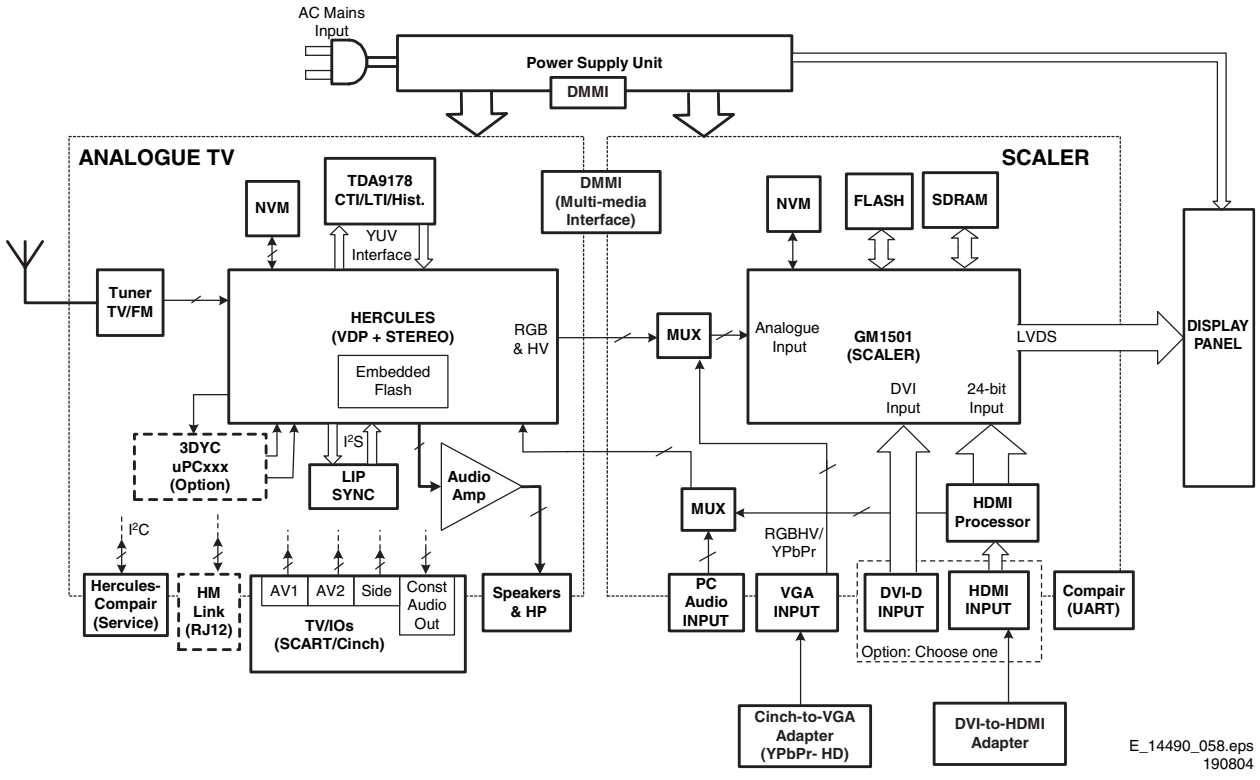


Figure 9-1 Block diagram

The PLL tuner UR1316 (with FM radio) delivers the IF-signal, via audio & video SAW-filters, to the Video Signal Processor and FLASH embedded TEXT/Control/Graphics Micro Controller TDA120x1 (item 7011, also called Hercules). This IC has the following functions:

- Analogue Video Processing
- Sound Demodulation
- Audio Interfaces and switching
- Volume and tone control for loudspeakers
- Reflection and delay for loudspeaker channels
- Micro Controller
- Data Capture
- Display

The Hercules has one input for the internal CVBS signal and a video switch with 3 external CVBS inputs and a CVBS output. All CVBS inputs can be used as Y-input for Y/C signals. However, only 2 Y/C sources can be selected because the circuit has 2 chroma inputs. It is possible to add an additional CVBS(Y)/C input (CVBS/YX and CX) when the YUV interface and the RGB/YPRPB input are not needed. Two SCART-connectors are used: SCART1 is fully equipped and SCART2 is meant for VCR. Pin 10 of SCART2 is used for Easylink (P50) and there is a possibility for Y/C in. The CVBS-out on pin 19 can be used for WYSIWYR (What You See Is What You Record).

The video part delivers the RGB signals to the Scaler IC.

The Genesis GM1501 Malibu Scaler IC can receive two video input signals: SDTV (from the Hercules), DVI (from an external DVI source), or PC (from an external computer).
After the video processing, the digital data is sent via a Low Voltage Differential Signalling bus to the LCD panel. LVDS is used to improve data speed and to reduce EMI significantly.
There are two I^2C lines and two interrupt and communication lines (TV_IRQ and TV_SC_COM) for the Scaler control. The Scaler communicates with the Hercules as a slave device. To avoid buffer overflow at the Scaler side, the TV_SC_COM line provides the necessary hardware flow control. To allow bi-directional communication, the Scaler can initiate a service interrupt-request to the Hercules via the TV_IRQ line.

The Hercules and EEPROM are supplied with 3.3 V, which is also present during STANDBY.
The EEPROM, or NVM (Non Volatile Memory), is used to store the settings.

The sound part is built up around the Hercules. The Source Selection, Decoding and Processing are all done by the Hercules.

Power supply input are several DC voltages coming from a supply panel.

9.3 Power Supply

For Service, this supply panel is a black box. When defect a new panel must be ordered.

9.4 Input/Output

The I/O is divided over two parts: Rear I/O and Side I/O. The rear has two SCART inputs, a PC (VGA) input, a DVI input, and an Audio input. The side has a CVBS and Y/C (SVHS) input.

EXT1: The input of SCART1 is CVBS + RGB + L/R and the output is the video (+ sound) signal from the tuner (SC1_CVBS_RF_OUT).

EXT2: The input of SCART2 is Y/C + CVBS + L/R. The output signal is CVBS_SC2_MON_OUT (+ sound).
SCART2 is meant for VCR and has therefore some additional signals in relation to EXT1 but no RGB: it has the possibility for Y/C_in: Y_in on pin 20 and Chroma_in on pin 15.
The selection of the external I/O's is controlled by the Hercules.

PC (VGA) in: This input is directly going to the Scaler IC. See paragraph “Video: Scaler Part”.

9.5 Tuner and IF

A Philips UR13xx Tuner with second input (for FM Radio) is used in the TV board. The SIF and FM signals are decoded by the Hercules. Tuning is done via I^2C.

9.5.1 Video IF Amplifier

The IF-filter is integrated in a SAW (Surface Acoustic Wave) filter. One for filtering IF-video (1328) and one for IF-audio (1330). The type of these filters depends on the standard(s) that has/have to be received.

The output of the tuner is controlled via an IF-amplifier with AGC-control. This is a voltage feedback from pin 31 of the Hercules to pin 1 of the tuner. The AGC-detector operates on top sync and top white level. AGC take-over point is adjusted via the service alignment mode “Tuner” -”'AGC”. If there is too much noise in the picture, then possibly the AGC setting is wrong. The AGC-setting could also be mis-aligned if the picture deforms with perfect signal. In that case, the IF-amplifier amplifies too much, resulting in a distorted video-signal.

9.6 Video: TV Part (Diagrams A1, A2, and A3)

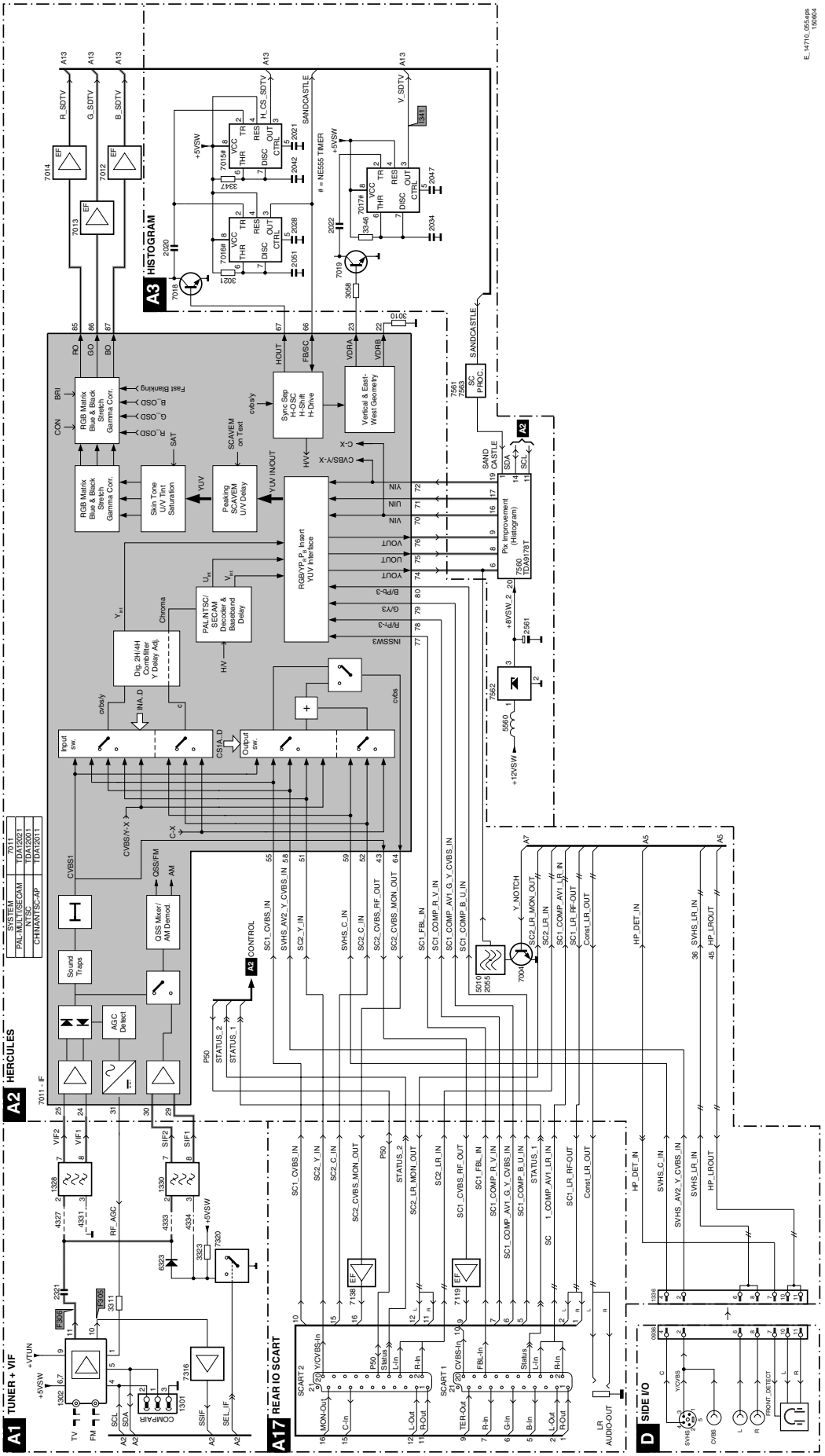


Figure 9-2 Block diagram video processing

The video processing is completely handled by the Hercules
- IF demodulator.
- Chrominance decoder
- Sync separator.
- Horizontal & vertical drive.
- RGB processing.
- CVBS and SVHS source select.

It has also build in features like:
- CTI.
- Black stretch.
- Blue stretch.
- White stretch.
- Slow start up.
- Dynamic skin tone correction etc.

Further, it also incorporates sound IF traps and filters, and requires only one crystal for all systems.

9.6.1 Histogram (YUV Picture Improvement) IC

The demodulated video-signal can be checked on pins 74, 75, and 76 of IC7011 and is fed to pins 70, 71, and 72. In this path, the Histogram IC TDA9171 is inserted.
This TDA9178 can control various picture improvements:
- Histogram processing.
- Colour transient improvement.
- Luminance transient improvement.
- Black and white stretch.
- Skin tone correction.
- Green enhancement.
- Blue stretch.
- Smart peaking.
- Video dependent coring.
- Colour dependent stretching.

Since the TDA9171 is connected to the Hercules, picture improvement works only for signals that are routed trough the Hercules and not for signals directly connected to the Scaler.

9.7 Video: Scaler Part (Diagram A7 and A13)

The Genesis gm1501 Scaler is a dual channel graphics and video processing IC for LCD monitors and televisions incorporating Picture in Picture, up to SXGA output resolutions. The Scaler controls the display processing in an LCD TV (in a CRT-based TV, the deflection circuit would do this). It controls all the view modes (e.g. like "zooming" and "shifting"). Features like PC (VGA) or HD inputs, are also handled by this part.

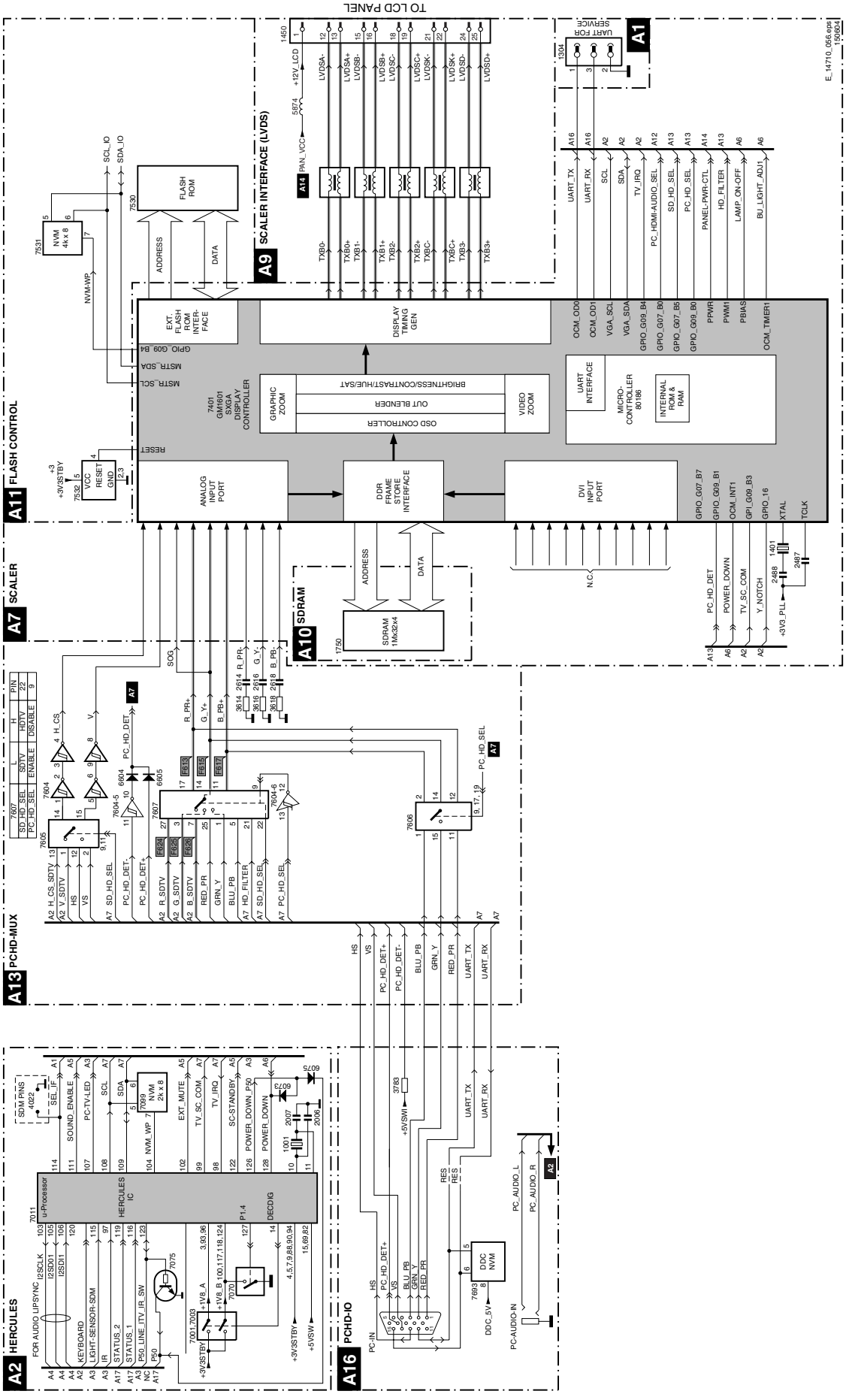


Figure 9-3 Block diagram Scaler Part

9.7.1 Features

The Scaler provides several key IC functions:
- Scaling.
- Auto-configuration/ Auto-Detection.
- Various Input Ports:
  - Analog RGB.
  - Video Graphics.
- Integrated LVDS Transmitter.
- On-chip Micro-controller

9.7.2 Inputs

Analog RGB
The RGB input is fed to pins B2, C2 and D2. This input consists of either the Hercules RGB output or the RGB/YPbPr input of the VGA connector. The Scaler can switch between the two signals via the PC_HD_SEL signal and selection IC SM5301.

PC (VGA) Input
The VGA input is processed by the VGA block of the Scaler. The Scaler supports pixel frequencies up to 165 MHz. YPbPr format is also supported via the VGA interface and covers a resolution of 480p/560p/720p/1080i.

9.7.3 Output

The Display Output Port provides data and control signals that permit the Scaler to connect to a variety of display devices using a TTL or LVDS interface. The output interface is configurable for single or dual wide TTL/LVDS in 18, 24 or 30-bit RGB pixels format. All display data and timing signals are synchronous with the DCLK output clock. The integrated LVDS transmitter is programmable to allow the data and control signals to be mapped into any sequence depending on the specified receiver format.

9.8 Audio Processing

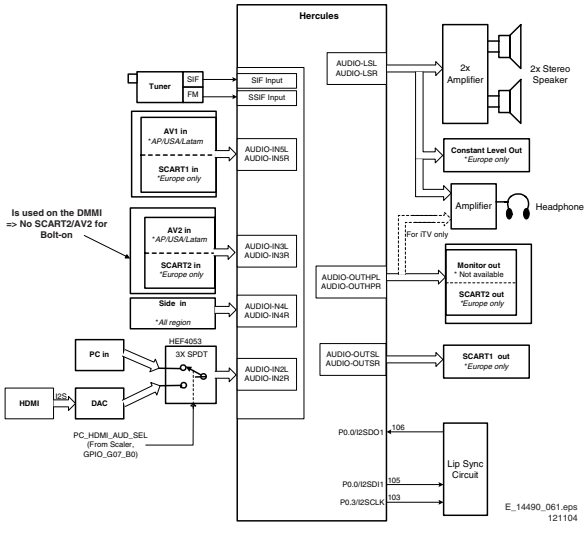


Figure 9-4 Block diagram audio processing

The audio decoding is done entirely via the Hercules. The IF output from the Tuner is fed directly to either the Video-IF or the Sound-IF input depending on the type of concept chosen. There are mainly two types of decoder in the Hercules, an analogue decoder that decodes only Mono, regardless of any standards, and a digital decoder (or DEMDEC) that can decode both Mono as well as Stereo, again regardless of any standards.

In this chassis, the analogue decoder is used in two cases:
- It is used for AM Sound demodulation in the Europe SECAM LL' transmission.
- It is used for all FM demodulation in AV-Stereo sets.

9.8.1 Diversity

The diversity for the Audio decoding can be broken up into two main concepts:
- The Quasi Split Sound concept used in Europe and some AP sets.
- The Inter Carrier concept, used in NAFTA and LATAM.

The UOC-III family makes no difference any more between QSS- and Intercarrier IF, nearly all types are software-switchable between the two SAW-filter constructions.

Simple data settings are required for the set to determine whether it is using the Inter Carrier or the QSS concept. These settings are done via the "QSS" and "FMI" bit found in SAM mode. Due to the diversity involved, the data for the 2 bits are being placed in the NVM location and it is required to write once during start-up.

On top of that, it can be further broken down into various systems depending on the region. The systems or region chosen, will in turn affect the type of sound standard that is/are allowed to be decoded.
- For the case of Europe, the standard consists of BG/DK/I/LL' for a Multi-System set. There are also versions of Eastern Europe and Western Europe set and the standard for decoding will be BG/DK and I/DK respectively. FM Radio is a feature diversity for the Europe sets. The same version can have either FM Radio or not, independent of the system (e.g. sets with BG/DK/I/LL' can have or not have FM radio).
- For the case of NAFTA and LATAM, there is only one transmission standard, which is the M standard. The diversity then will be based on whether it has a dBx noise reduction or a Non-dBx (no dBx noise reduction).
- For the case of AP, the standard consists of BG/DK/I/M for a Multi-System set. The diversity here will then depend on the region. AP China can have a Multi-System and an I/DK version. For India, it might only be BG standard.

9.8.2 Functionality

The features available in the Hercules are as follows:
- Treble and Bass Control.
- Surround Sound Effect that includes:
  - Incredible Stereo.
  - Incredible Mono.
  - 3D Sound (not for AV Stereo).
  - TruSurround (not for AV Stereo).
  - Virtual Dolby Surround, VDS422 (not for AV Stereo).
  - Virtual Dolby Surround, VDS423 (not for AV Stereo).
  - Dolby Pro-Logic (not for AV Stereo).
- Bass Feature that includes:
  - Dynamic Ultra-Bass.
  - Dynamic Bass Enhancement.
  - BBE (not for AV Stereo).
- Auto-Volume Leveller.
- 5 Band Equalizer.
- Loudness Control.

All the features stated are available for the Full Stereo versions and limited features for the AV Stereo

9.8.3 Audio Amplifier

The audio amplifier part is very straightforward. It uses the integrated power amplifier TDA7297D, and delivers a maximum output of 2 x 15 W_{RMS}.
The maximum operating condition for this amplifier is 20 V unloaded. Normal operating supply is from 6.5 V to 18 V. Muting is done via the SOUND_ENABLE line connected to pin 13 of the amplifier-IC and coming from the Hercules.

9.8.4 Audio: Lip Sync (Optional)

A “lip sync” circuit with an audio delay can be added (not for all models/regions), in order to synchronise with video delay due to the complexity of the display processing. This video delay is significant, due to memory based processing. For instance, the “frame rate conversion” causes a delay of two frames, while the LCD panel response also causes a delay.

The circuit is a (16 bit) FIFO based digital delay. E.g.: the memory size required for a 80 ms delay (with a data clock of 1.024 MHz) can be calculated with: Memory size = delay time * f_clk. This gives: 80 ms * 1.024 MHz = 81920 bits.

To calculate the memory size for a 16 bits mode I^2S digital audio stream we must use the following data:

- f_s = 32 kHz, 16 bits, stereo
- Data clock = 32 kHz * 16 * 2 = 1.024 MHz
- Memory size for 1 ms delay = 1 ms * 1.024 MHz = 1024 bits = 1 kbit

So, the delay time of 80 ms can be built with five steps of 16 ms, which is close to the frame rate. Therefore, a 128 kbit SRAM (16 x 8) is chosen.

9.8.2 Block Diagram

The block diagram of the Micro Controller application is shown below.

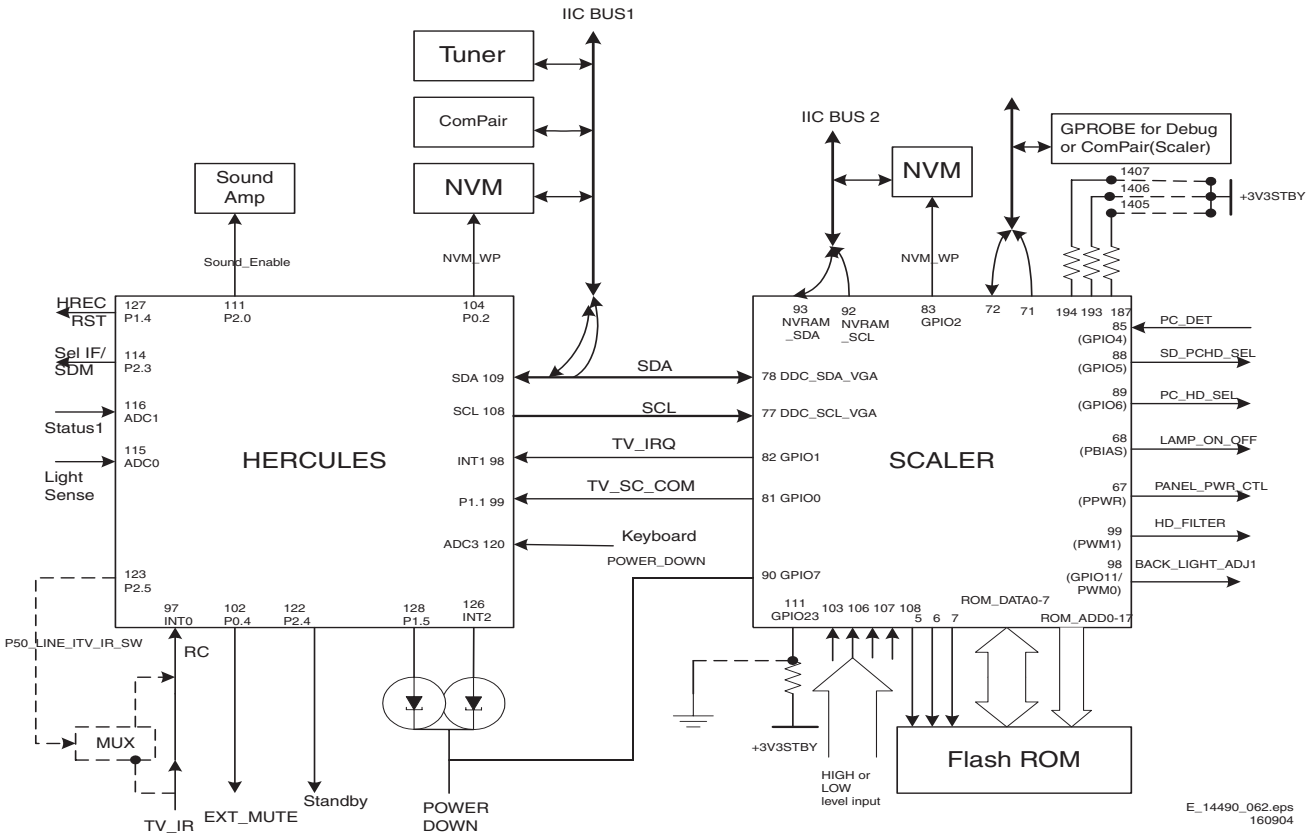


Figure 9-5 Micro controller block diagram

Note that above described calculation is just an example, values in the set can deviate.

9.9 Control

9.9.1 Hercules

The System Board has two main micro-controllers on board. These are:

- On-chip x86 micro-controller (OCM) from Genesis LCD TV/ Monitor Controller.
- On-chip 80C51 micro-controller from Philips Semiconductor UOCIII (Hercules) series.

Each micro-controller has it own I^2C bus which host its own internal devices.
The Hercules is integrated with the Video and Audio Processor. For dynamic data storage, such as SMART PICTURE and SMART SOUND settings, an external NVM IC is being used. Another feature includes an optional Teletext/Closed Caption decoder with the possibility of different page storage depending on the Hercules type number.

9.9.3 Basic Specification

The Micro Controller operates at the following supply voltages:
- +3.3 V_{DC} at pins 4, 88, 94, and 109.
- +1.8 V_{DC} at pins 93, 96, and 117.
- I^2C pull up supply: +3.3V_{DC}.

9.9.4 Pin Configuration and Functionality

The ports of the Micro Controller can be configured as follows:
- A normal input port.
- An input ADC port.
- An output Open Drain port.
- An output Push-Pull port.
- An output PWM port.
- Input/Output Port

The following table shows the ports used for the L04 control:

Table 9-1 Micro Controller ports overview

Pin	Name	Description	Configuration
97	INT0/ P0.5	IR	INT0
98	P1.0/ INT1	TV_IRQ	INT2
99	P1.1/ T0	TV_SC_COM	P1.1
102	P0.4/ I^2SWS	EXT_MUTE	P0.4
103	P0.3/ I^2SCLK	Lip Sync	I^2SCLK
104	P0.2/ I^2SDO2	NVM_WP	P0.2
105	P0.1/ I^2SDO1	Lip Sync	I^2SDO1
106	P0.0/ I^2SDI/O	Lip Sync	I^2SDI/O
107	P1.3/ T1	PC-TV_LED	P1.3
108	P1.6/ SCL	SCL	SCL
109	P1.7/ SDA	SDA	SDA
111	P2.0/ TPWM	SOUND_ENABLE	P2.0
112	P2.1/ PWM0	(for future use)	-
113	P2.2/ PWM1	(for future use)	-
114	P2.3/ PWM2	SEL_IF	P2.3
115	P3.0/ ADC0	Light Sensor - SDM	ADC0
116	P3.1/ ADC1	STATUS_1	ADC1
119	P3.2/ ADC2	STATUS_2	ADC2
120	P3.3/ ADC3	KEYBOARD	ADC3
122	P2.4/ PWM3	STANDBY	P2.4
123	P2.5/ PWM4	(for future use)	-
126	P1.2/ INT2	(for future use)	-
127	P1.4/ RX	HERC_RESET	-
128	P1.5/ TX	POWER_DOWN	P1.5

The description of each functional pin is explained below:
- **LED.** This signal is used as an indication for the Stand-by, Remote and Error Indicator. Region diversity:
  - During protection mode, the LED blinks and the set is in stand-by mode.
  - During error conditions it blinks at a predefined rate.
  - After receiving a valid RC-5 or local keyboard command it flashes once.
  - For sets with error message indication, the LED blinks when message is active and the set is in stand-by mode.
- **SCL.** This is the clock wire of the two-wire single master bi-directional I^2C bus.
- **SDA.** This is the data wire of the two-wire single master bi-directional I^2C bus.
- **STANDBY.** The Hercules generates this signal. This can enable the power supply in normal operation and disable it during Stand-by. It is of logic “high” level (3.3 V) under normal operation and “low” (0 V) during Stand-by.
- **IR.** This input pin is connected to an RC5 remote control receiver.
- **SEL-IF.** This is an output pin to switch the Video SAW filter between M system and other systems.
  - 0: NTSC M (default)
  - 1: PAL B/G, DK, I, L
- **NVM_WP.** The global protection line is used to enable and disable write protection to the NVM. When write to the NVM is required, pin 7 of the NVM must be pulled to logic ‘0’ first (via Write_Protect of the micro-controller pin) before a write operation is performed. Otherwise pin 7 of NVM must always be at logic “1”
  - 0: Disabled
  - 1: Enabled (default)
- **SOUND_ENABLE.** This pin is used to MUTE the (push-pull) audio amplifier.
- **STATUS_1.** This signal is used to read the status of the SCART 1 input.
- **STATUS_2.** This signal is used to read the status of the SCART 2 input.
- **HERC_RESET.** This pin is use to switch the +1.8V supply.
- POWER_DOWN. The power supply generates this signal. Logic “high” (3.3 V) under normal operation of the TV and goes “low” (0 V) when the Mains input voltage supply goes below 70 V_{AC}.
- Keyboard. Following are the Keyboard functions and the step values (8 bit) for it.

Table 9-2 Local keyboard values

Function	Voltage (V_{DC})	Step values (8 bit)
NAFTA Stand-by	0	0 - 6
Ch +	0.43	7 - 33
Exit Factory (Ch- and Vol-)	0.69	34 - 53
Ch -	0.93	54 - 73
Menu (Vol - and Vol +)	1.19	74 - 96
Vol -	1.49	97 - 121
DVD Eject	1.8	122 - 147
Vol +	2.12	148 - 169

- **TV_IRQ.** This signal is the interrupt from the Scaler IC.
- **TV_SC_COM.** This signal is used for the communication with the Scaler IC.
- **EXT_MUTE.** This signal is used to reduce the Switch-off plop.

9.10 Abbreviation List

0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16:9 format, 12 = play 4:3 format
1080i	1080 visible lines, interlaced
1080p	1080 visible lines, progressive scan
2CS	2 Carrier Sound (or 2 Channel Stereo)
480i	480 visible lines, interlaced
480p	480 visible lines, progressive scan
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control; Control signal used to tune and lock to the correct frequency
AGC	Automatic gain control (feedback) signal to the tuner. This circuit ensures a constant output amplitude regardless of the input amplitude
AM	Amplitude Modulation; A "data encoding to a carrier" method, such that the carrier amplitude is proportional to the data value
AP or A/P	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASD	Automatic Standard Detection
AUO	Acer Unipack Optical (supplier)
AV	External Audio Video
B-SC1-IN	Blue EXT1/SCART1 in
B-SC2-IN	Blue EXT2/SCART2 in
B-TXT	Blue TeleteXT
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz B= VHF-band, G= UHF-band
BOCMA	Bimos one Chip Mid-end Architecture: video and chroma decoder
C-FRONT	Chrominance front input
CBA	Circuit Board Assembly (also named PCB or PWB)
CL	Constant Level: audio output to connect with an external amplifier
CLUT	Colour Look Up Table
ComPair	Computer aided rePair. A tool for diagnosing a TV through a PC controlled interface
CSM	Customer Service Mode
CVBS	Composite Video and Blanking Signal; A single video signal that contains luminance, colour, and timing information
CVBS-EXT	CVBS signal from external source (VCR, VCD, etc.)
CVBS-INT	CVBS signal from internal Tuner
CVBS-MON	CVBS monitor signal
CVBS-TER-OUT	CVBS TERrestrial OUTput signal
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DFU	Directions For Use: owner's manual
DNR	Dynamic Noise Reduction
DRAM	Dynamic RAM; dynamically refreshed RAM
DSP	Digital Signal Processing
DST	Dealer Service Tool; Special remote control designed for dealers to enter e.g. service mode (a DST-emulator is available in ComPair)
DTS	Digital Theatre System; A multi-channel surround sound format, similar to Dolby Digital
DVD	Digital Versatile Disc
EEPROM	Electrically Erasable and Programmable Read Only Memory
EPG	Electronic Program Guide: system used by broadcasters to transmit TV guide information (= NexTView)
EU	EUrope
EXT	EXTernal (source), entering the set by SCART or by cinches (jacks)
FBL	Fast BLanking; DC signal accompanying RGB signals. To blank the video signal when it is returning from the right side of the screen to the left side. The video level is brought down below the black video level
FBL-SC1-IN	Fast blanking signal for SCART1 in
FBL-SC2-IN	Fast blanking signal for SCART2 in
FBL-TXT	Fast Blanking Teletext
FLASH	FLASH memory
FM	Field Memory: A memory chip that is capable of storing one or more TV picture fields / Frequency Modulation: A technique that sends data as frequency variations of a carrier signal
FMR	FM Radio: Radio receiver that can receive the FM Band 87.5 - 108 MHz
FRC	Frame Rate Converter
FRONT-C	Front input chrominance (SVHS)
FRONT-DETECT	Control line for detection of headphone insertion, Service Mode jumper, power failure detection
FRONT-Y_CVBS	Front input luminance or CVBS (SVHS)
G-SC1-IN	Green SCART1/EXT1 in
G-SC2-IN	Green SCART2/EXT2 in
G-TXT	Green teletext
H	H_sync to the module
HA	Horizontal Acquisition: horizontal sync pulse coming out of the BOCMA
HD	High Definition
HP	Head Phone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz; VHF- and UHF-band
I^2C	Inter IC bus (also called IIC)
I^2S	Inter IC Sound bus
IC	Integrated Circuit
IF	Intermediate Frequency
Interlaced	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in "pairs", causing line flicker.
IR	Infra Red
IRQ	Interrupt ReQuest
Last Status	The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according the customer's preferences
LATAM	LATin AMerica
LC04	Philips chassis name for LCD TV 2004 project
LCD	Liquid Crystal Display
LED	Light Emitting Diode; A semiconductor diode that emits light when a current is passed through it
LINE-DRIVE	Horizontal (line) deflection drive signal (for the Line transistor)
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LS	Loud Speaker

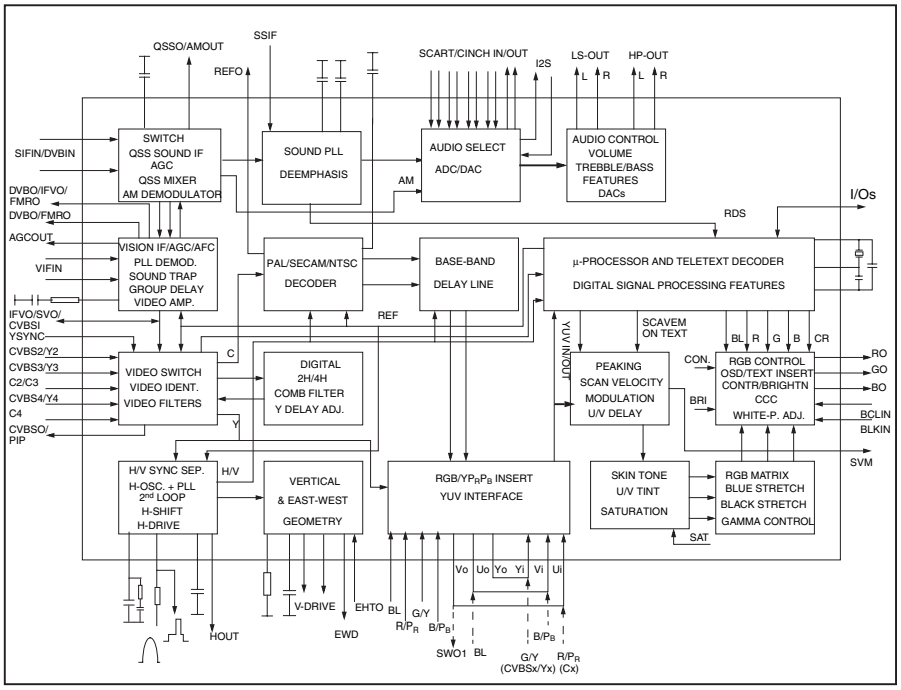
LVDS	Low Voltage Differential Signalling, data transmission system for high speed and low EMI communication.
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz. M= 525 lines @ 60 Hz, N= 625 lines @ 50 Hz
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
MPEG	Motion Pictures Experts Group. An ISO/IEC body that has given its name to an image compressing scheme for moving video
MSP	Multi-standard Sound Processor: ITT sound decoder
MUTE	MUTE Line
NC	Not Connected
NICAM	Near Instantaneously Companded Audio Multiplexing. This is a digital sound system, used mainly in Europe.
NTSC	National Television Standard Committee. Colour system used mainly in North America and Japan. Colour carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory; IC containing data such as alignment values, preset stations
O/C	Open Circuit
ON/OFF LED	Active-LOW control line. Logic LOW = red LED "on", HIGH = red LED "off"
OSD	On Screen Display
P50	Project 50; Communication protocol between TV and peripherals
PAL	Phase Alternating Line. Colour system used mainly in Western Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PC	Personal Computer
PCB	Printed Circuit Board (also called PWB or CBA)
PIG	Picture In Graphic
PIP	Picture In Picture
PLL	Phase Locked Loop. Used, for example, in FST tuning systems. The customer can give in directly the desired frequency
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.
PWB	Printed Wiring Board (also called PCB or CBA)
RAM	Random Access Memory
RC	Remote Control transmitter
RC5	Remote Control system 5, the signal format from the remote control
RGB	Red, Green, and Blue colour space; The primary colour signals for TV. By mixing levels of R, G, and B, all colours (Y/C) are reproduced
RGBHV	Red, Green, Blue, Horizontal sync, and Vertical sync
ROM	Read Only Memory
SAM	Service Alignment Mode
SC	SandCastle: two-level pulse derived from sync signals
SC1-OUT	SCART output of the MSP audio IC
SC2-B-IN	SCART2 Blue in
SC2-C-IN	SCART2 chrominance in
SC2-OUT	SCART output of the MSP audio IC
S/C	Short Circuit
SCART	Syndicat des Constructeurs d'Appareils Radiorécepteurs et Téléviseurs; This is a 21-pin connector used in EU, that carries various audio, video, and control signals (it is also called Péritel connector)
SCL	CLock Signal on I^2C bus
SD	Standard Definition
SDA	Serial Data line of I^2C bus
SDI	Samsung Display Industry (supplier)
SDRAM	Synchronous DRAM
SECAM	SÉquence Couleur Avec Mémoire; Colour system mainly used in France and East Europe. The chroma is FM modulated and the R-Y and B-Y signals are transmitted line sequentially. Colour carriers= 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SMPS	Switched Mode Power Supply
SND	SouND
SNDL-SC1-IN	Sound left SCART1 in
SNDL-SC1-OUT	Sound left SCART1 out
SNDL-SC2-IN	Sound left SCART2 in
SNDL-SC2-OUT	Sound left SCART2 out
SNDR-SC1-IN	Sound right SCART1 in
SNDR-SC1-OUT	Sound right SCART1 out
SNDR-SC2-IN	Sound right SCART2 out
SNDR-SC2-OUT	Sound right SCART2 out
SNDS-VL-OUT	Surround sound left variable level out
SNDS-VR-OUT	Surround sound right variable level out
SOPS	Self Oscillating Power Supply
S/PDIF	Sony Philips Digital InterFace; This is a consumer interface used to transfer digital audio
SRAM	Static RAM
STBY	STand-BY
SVHS	Super Video Home System
SW	Sub Woofer / SoftWare / Switch
THD	Total Harmonic Distortion
TXT	Teletext; TXT is a digital addition to analogue TV signals that contain textual and graphical information (25 rows x 40 columns). The information is transmitted within the first 25 lines during the Vertical Blank Interval (VBI)
uP	Microprocessor
VA	Vertical Acquisition
VL	Variable Level out: processed audio output toward external amplifier
VCR	Video Cassette Recorder
VGA	Video Graphics Array; 640x480 (4:3)
WD	Watch Dog
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
YPbPr	This is a scaled version of the YUV colour space. Y= Luminance, Pb/Pr= Colour difference signals B-Y and R-Y, other amplitudes w.r.t. to YUV
Y/C	Y consists of luminance signal, blanking level and sync; C consists of chroma (colour) signal
Y-OUT	Luminance-signal
YUV	Colour space used by the NTSC and PAL video systems. Y is the luminance and U/V are the colour difference signals

9.11 IC Data Sheets

This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

9.11.1 Diagram A2, Type TDA12029H (IC7011)

Block diagram of the “AV-stereo” TV processor with audio DSP



Pin configuration “stereo” and “AV-stereo” versions with Audio DSP

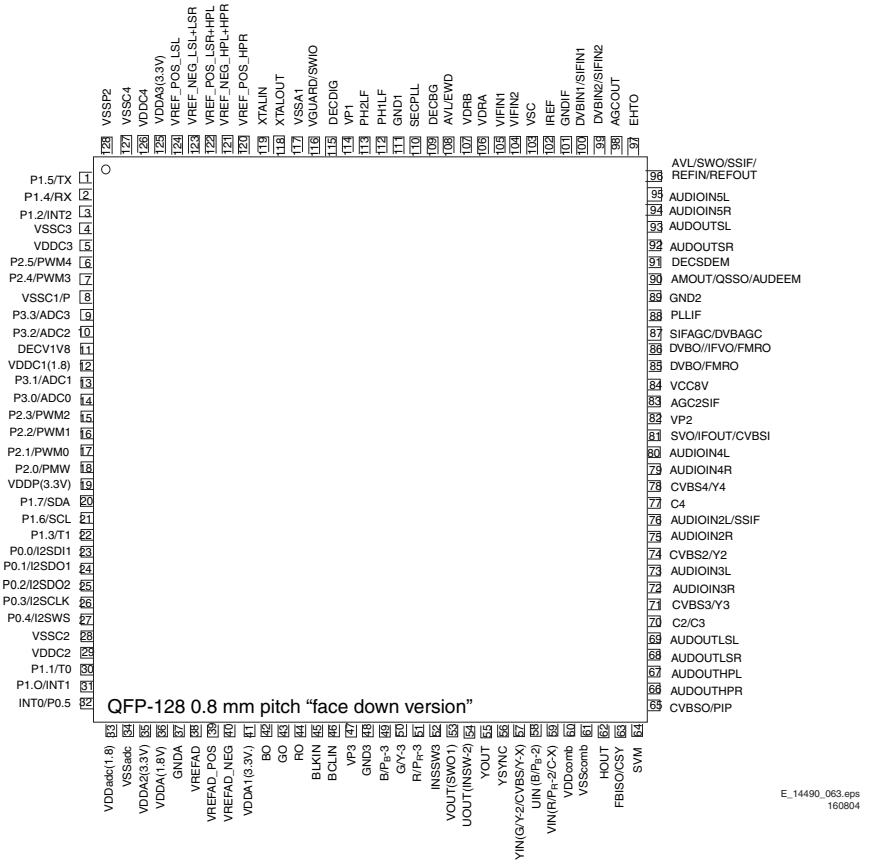
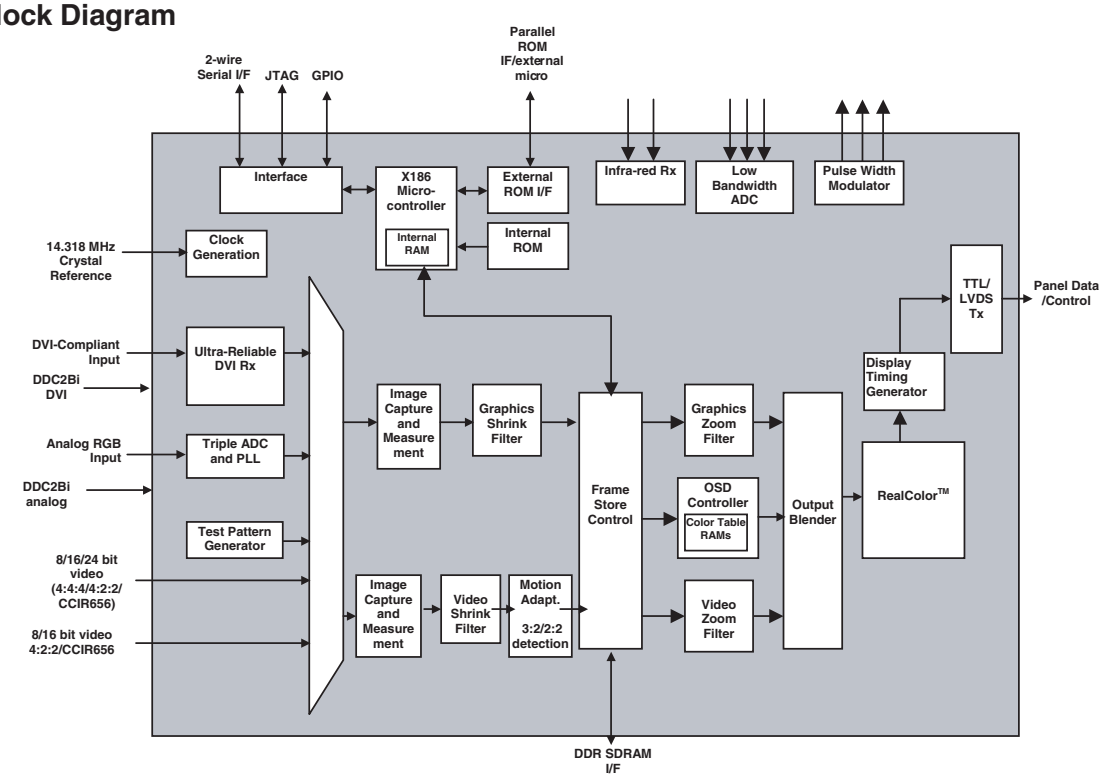


Figure 9-6 Internal block diagram and pin configuration

9.11.2 Diagram A7, Type GM1501 (IC7401)

Block Diagram



Pin Configuration

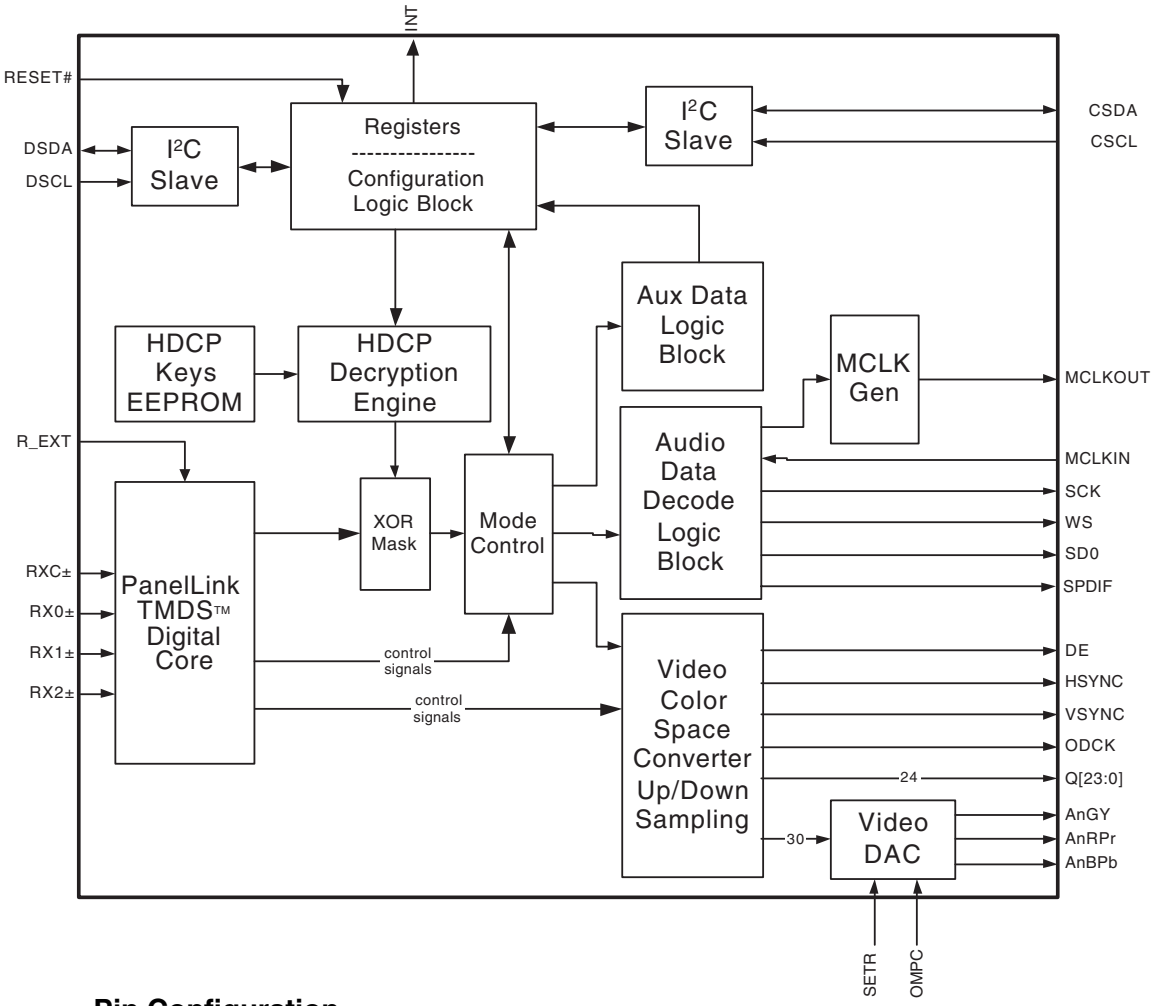
	1	2	3	4	5	6	7	8	9	10	11	12	13
A	NC	ADC_3.3	ADC_1.8	ADC_1.8	ADC_DGND	RXC+	DVI_GND	RX0+	RX1+	RX2+	DVI_GND	LBADC_IN3	D_GND
B	BLUE-	BLUE+	ADC_3.3	ADC_DGND	DVI_GND	RXC-	DVI_GND	RX0-	RX1-	RX2-	REXT	LBADC_IN2	D_GND
C	GREEN-	GREEN+	SOG	ADC_AGND	NC	DVI_3.3	DVI_GND	DVI_3.3	DVI_3.3	DVI_3.3	DVI_3.3	LBADC_IN1	LBADC_33
D	RED-	RED+	ADC_3.3	ADC_AGND	NC	DVI_1.8	DVI_GND	DVI_1.8	DVI_1.8	DVI_1.8	DVI_GND	LBADC_ RETURN	LBADC_GND
E	ADC_AGND	ADC_AGND	ADC_3.3	ADC_AGND									
F	NC	VDDD33_ PLL	VSSA33_ RPLL	VDDA33_ RPLL									
G	VDDA33_ FPLL	VSSD33_ PLL	TCLK	XTAL									
H	VDDD33_ SDDS	VSSA33_ SDDS	VDDA33_ SDDS	VSSA33_ FPLL									
J	VDDD33_ DDDS	VSSA33_ DDDS	VDDA33_ DDDS	VSSD33_ SDDS									
K	RESETn	ACS_ RSET_HD	NC	VSSD33_ DDDS						CORE_1.8	CORE_1.8	D_GND	D_GND
L	OCM_INT2	OCM_INT1	AVSYNC	AHSYNC						D_GND	CORE_1.8	D_GND	D_GND
M	OCM_UDO	OCM_UDI	IR0	IR1						D_GND	D_GND	D_GND	D_GND
N	VGA_SDA	VGA_SCL	DVI_SDA	DVI_SCL						D_GND	D_GND	D_GND	D_GND
P	OCM_CS1n	OCM_CS2n	MSTR_SDA	MSTR_SCL						D_GND	D_GND	D_GND	D_GND
R	ROM_CSn	OCM_REn	OCM_WEn	EXTCLK						D_GND	D_GND	D_GND	D_GND
T	OCMADDR 17	OCMADDR 18	OCMADDR 19	OCM_CS0n						D_GND	CORE_1.8	D_GND	D_GND
U	OCMADDR 13	OCMADDR 14	OCMADDR 15	OCMADDR 16						CORE_1.8	CORE_1.8	D_GND	D_GND
V	OCMADDR 9	OCMADDR 10	OCMADDR 11	OCMADDR 12									
W	OCMADDR 6	OCMADDR 7	OCMADDR 8	IO_3.3									
Y	OCMADDR 3	OCMADDR 4	OCMADDR 5	IO_3.3									
AA	OCMADDR 0	OCMADDR 1	OCMADDR 2	IO_3.3									
AB	OCMDATA13	OCMDATA14	OCMDATA15	IO_3.3									
AC	OCMDATA10	OCMDATA11	OCMDATA12	IO_3.3	GPIO_G09_ B2 (DEGRN0)	IO_3.3	DCLK	IO_3.3	GPIO_G07_ B2 (DERED4)	IO_3.3	SHIELD[1] (DEGRN3)	LVDSB_3.3	LVDSB_GND
AD	OCMDATA9	OCMDATA6	OCMDATA3	OCMDATA0	GPIO_G09_ B3 (DEGRN1)	GPIO_G08_ B0 (DORED0)	DEN	GPIO_G08_ B5 (DOBLU1)	GPIO_G07_ B3 (DERED5)	GPIO_G07_ B6 (DERED8)	SHIELD[2] (DEGRN4)	LVDSB_3.3	LVDSB_3.3
AE	OCMDATA8	OCMDATA5	OCMDATA2	GPIO_G09_ B0 (DERED0)	GPIO_G09_ B4 (DEBLU0)	GPIO_G08_ B1 (DORED1)	GPIO_G08_ B3 (DOGRN1)	GPIO_G07_ B0 (DERED2)	GPIO_G07_ B4 (DERED6)	GPIO_G07_ B7 (DERED9)	SHIELD[3] (DEGRN5)	BC+ (DEGRN8)	SHIELD[4] (DEBLU2)
AF	OCMDATA7	OCMDATA4	OCMDATA1	GPIO_G09_ B1 (DERED1)	GPIO_G09_ B5 (DEBLU1)	GPIO_G08_ B2 (DOGRN0)	GPIO_G08_ B4 (DOBLU0)	GPIO_G07_ B1 (DERED3)	GPIO_G07_ B5 (DERED7)	SHIELD[0] (DEGRN2)	B3+ (DEGRN6)	B3- (DEGRN7)	BC- (DEGRN9)

E_14490_099.eps
241204

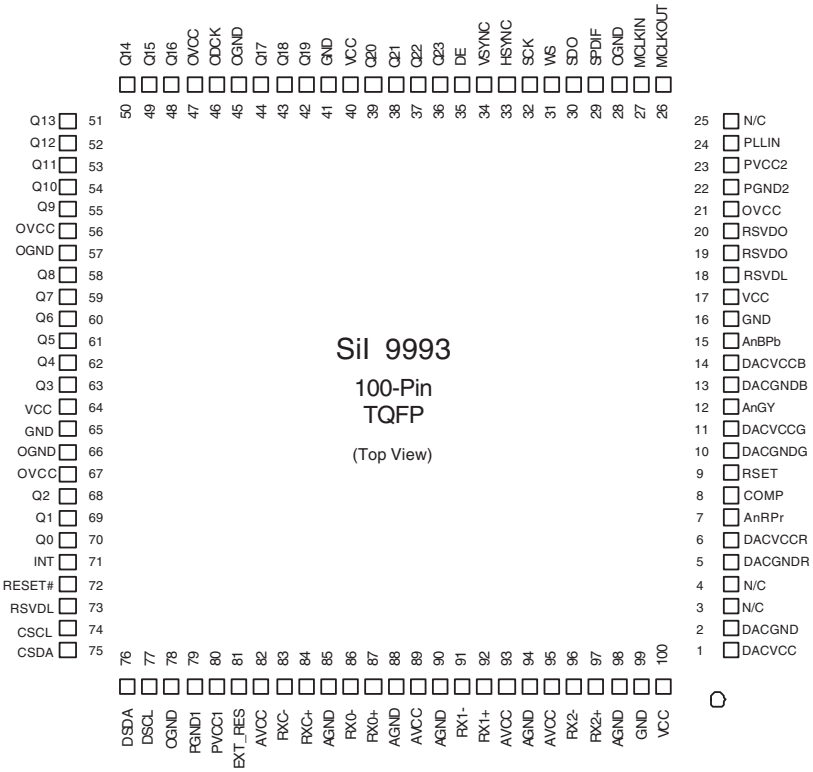
Figure 9-7 Internal block diagram and pin configuration

9.11.3 Diagram A12, Type Sil9993CT (IC7808)

Block Diagram



Pin Configuration



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170305

Figure 9-8 Internal block diagram and pin configuration

10. Spare Parts List

Set Level

Various

0032	3122 137 23171	Power supply unit
0041	3139 124 62171	PC LENS
0601	3139 127 04064	TDA15021H
0621	3139 127 03981	DDC VGA 32 LC04SD12
8187⚠	9965 000 07586	AC CORD SET (BS)
8188⚠	2422 070 98151	MAINSCORD EUR 1M5 BK B
8903	3139 131 05321	Cable 04P/560
8J02	3139 131 05651	Cable PSU
8J04	3104 311 09251	Cable 9P/140/9P
8K01	3139 131 05671	Cable 12P/280/11P

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5213	2422 264 00537	Loudsp. 4Ω 15W Fullrange

TV & Scaler Board [A]

Various

0601	3139 127 04064	Hercules SW (check Prod. Survey)
0611	3139 127 04015	Scaler SW (check Prod. Survey)
1001	2422 543 01414	Xtal 24.576MHz
1101	2422 025 18133	Socket SCART
1102	2422 025 18133	Socket SCART
1251	2422 025 10655	Connector 11p m
1301	2422 025 16835	Connector 3p m
1302⚠	3139 147 19801	Tuner UV1318S/A IH -3
1320	2422 025 10771	Connector 10p m
1328	2422 549 44372	SAW 38.9MHz K3953L
1330	2422 549 44369	SAW 38.9MHz K9656L
1336	2422 025 10655	Connector 11p m
1401	2422 543 01133	Xtal 14.32MHz 20pF
1402	2422 025 10768	Connector 3p m
1403	2422 025 10771	Connector 10p m
1450	2422 025 18427	Connector 31p f
1681	2422 025 16835	Connector 3p m
1687	2422 025 18477	Socket sub-D 15p f h
1752	2422 025 10769	Connector 9p m
1860	2422 549 45325	Bead 67Ω at 100MHz
1861	2422 549 45325	Bead 67Ω at 100MHz
1862	2422 549 45325	Bead 67Ω at 100MHz
1863	2422 549 45325	Bead 67Ω at 100MHz
1864	2422 549 45325	Bead 67Ω at 100MHz

⊣⊢

2000	2020 552 00035	2.2µF 6.3V 10% 0603
2001	2020 552 96718	220nF 10% 6.3V 0402
2002	4822 124 23002	10µF 16V
2003	2238 869 15109	10pF 5% 50V 0402
2004	2020 552 96718	220nF 10% 6.3V 0402
2005	3198 035 71040	100nF 10% 16V 0402
2006	3198 034 06880	6.8pF 1% 50V 0402
2007	3198 034 06880	6.8pF 1% 50V 0402
2008	2020 552 00124	470nF 10% 10V 0603
2009	2020 552 96807	1µF 10% 10V 0603
2010	3198 035 26820	6.8nF 10% 16V 0402
2011	2020 552 96718	220nF 10% 6.3V 0402
2012	4822 124 12095	100µF 20% 16V
2013	3198 035 71040	100nF 10% 16V 0402
2014	3198 035 71040	100nF 10% 16V 0402
2015	3198 035 71040	100nF 10% 16V 0402
2016	3198 035 71040	100nF 10% 16V 0402
2017	3198 035 71040	100nF 10% 16V 0402
2018	3198 035 71040	100nF 10% 16V 0402
2019	4822 124 80151	47µF 16V
2020	2238 869 15101	100pF 5% 50V 0402
2021	2020 552 96628	10nF 10% 16V 0402
2022	3198 035 02210	220pF 5% 50V 0402
2023	3198 035 71040	100nF 10% 16V 0402
2024	4822 124 12095	100µF 20% 16V
2025	3198 035 71040	100nF 10% 16V 0402
2026	3198 035 71040	100nF 10% 16V 0402
2027	3198 035 71040	100nF 10% 16V 0402
2028	2020 552 96628	10nF 10% 16V 0402
2029	3198 035 71040	100nF 10% 16V 0402
2030	3198 035 71040	100nF 10% 16V 0402
2031	3198 035 71040	100nF 10% 16V 0402
2032	3198 035 71040	100nF 10% 16V 0402
2033	2020 552 96718	220nF 10% 6.3V 0402
2034	2020 552 00002	3.3nF 2% 50V 0805
2035	2020 552 96656	10µF 20% 25V 1210
2036	2020 552 96807	1µF 10% 10V 0603
2037	2020 552 96807	1µF 10% 10V 0603
2040	4822 124 23002	10µF 16V
2041	2020 552 96718	220nF 10% 6.3V 0402
2042	2020 552 00002	3.3nF 2% 50V 0805
2043	3198 035 71040	100nF 10% 16V 0402
2044	2020 552 96718	220nF 10% 6.3V 0402
2045	2238 869 15109	10pF 5% 50V 0402
2046	2238 869 15109	10pF 5% 50V 0402
2047	2020 552 96628	10nF 10% 16V 0402
2048	2238 869 15109	10pF 5% 50V 0402
2049	2238 869 15109	10pF 5% 50V 0402
2050	2238 869 15109	10pF 5% 50V 0402
2051	2020 552 00002	3.3nF 2% 50V 0805
2053	2020 552 96618	1nF 10% 50V 0402
2054	2020 552 96455	22nF 10% 16V 0402
2055	3198 034 02790	47pF 1% 50V 0402
2056	3198 035 71040	100nF 10% 16V 0402
2057	2238 869 15109	10pF 5% 50V 0402
2058	2238 869 15109	10pF 5% 50V 0402
2059	2238 869 15109	10pF 5% 50V 0402
2060	3198 035 71040	100nF 10% 16V 0402
2061	4822 124 23002	10µF 16V
2062	2238 869 15109	10pF 5% 50V 0402
2063	3198 017 31540	150nF 10V 0603
2067	2238 869 15109	10pF 5% 50V 0402
2068	2020 552 96718	220nF 10% 6.3V 0402
2069	2238 869 15109	10pF 5% 50V 0402
2071	4822 124 12095	100µF 20% 16V
2072	4822 126 14076	220nF +80/-20% 25V
2073	2020 552 96618	1nF 10% 50V 0402
2074	2020 552 96718	220nF 10% 6.3V 0402
2076	2020 552 96718	220nF 10% 6.3V 0402
2077	2020 552 96834	1µF 20% 6.3V 0402
2078	2238 869 15101	100pF 5% 50V 0402
2079	2238 869 15109	10pF 5% 50V 0402
2080	2238 869 15109	10pF 5% 50V 0402
2081	2238 869 15109	10pF 5% 50V 0402
2082	2020 552 96618	1nF 10% 50V 0402
2084	2020 552 96718	220nF 10% 6.3V 0402
2085	2020 552 96618	1nF 10% 50V 0402
2086	2020 552 96618	1nF 10% 50V 0402
2087	2238 869 15109	10pF 5% 50V 0402
2088	2238 869 15109	10pF 5% 50V 0402
2089	2020 552 96618	1nF 10% 50V 0402
2090	2238 869 15109	10pF 5% 50V 0402
2091	2238 869 15109	10pF 5% 50V 0402
2092	2238 869 15109	10pF 5% 50V 0402
2093	2238 869 15109	10pF 5% 50V 0402
2094	2238 869 15109	10pF 5% 50V 0402
2095	2238 869 15109	10pF 5% 50V 0402
2096	2238 869 15109	10pF 5% 50V 0402
2097	2238 869 15109	10pF 5% 50V 0402
2098	2238 869 15109	10pF 5% 50V 0402
2099	2020 552 96618	1nF 10% 50V 0402
2101	4822 126 14241	330pF 0603 50V
2103	4822 126 14241	330pF 0603 50V
2104	2020 552 96807	1µF 10% 10V 0603
2105	4822 126 14241	330pF 0603 50V
2107	4822 126 14241	330pF 0603 50V
2108	2020 552 96807	1µF 10% 10V 0603
2109	4822 126 13881	470pF 5% 50V
2110	4822 126 13881	470pF 5% 50V
2111	4822 126 13881	470pF 5% 50V
2112	4822 126 13881	470pF 5% 50V
2127	4822 126 14241	330pF 0603 50V
2128	2020 552 96807	1µF 10% 10V 0603
2129	4822 126 14241	330pF 0603 50V
2131	4822 126 14241	330pF 0603 50V
2132	2020 552 96807	1µF 10% 10V 0603
2133	4822 126 14241	330pF 0603 50V
2134	4822 126 13881	470pF 5% 50V
2135	4822 126 13881	470pF 5% 50V
2136	4822 126 13881	470pF 5% 50V
2137	4822 126 13881	470pF 5% 50V
2138	2020 552 00027	4.7µF 2% 6.3V 0603
2152	4822 126 14241	330pF 0603 50V
2155	4822 126 14241	330pF 0603 50V
2169	4822 124 23002	10µF 16V
2251	2238 869 15109	10pF 5% 50V 0402
2252	2238 869 15109	10pF 5% 50V 0402
2253	4822 124 23002	10µF 16V
2254	4822 124 23002	10µF 16V
2269	2020 012 00028	470µF 20% 16V
2271	2020 552 96437	100nF 10% 10V 0402
2302	4822 122 33761	22pF 5% 50V
2303	4822 122 33761	22pF 5% 50V
2307	3198 024 44730	47nF 50V 0603
2309	2022 031 00373	470µF 20% 16V
2311	2022 031 00308	22µF 20% 35V
2321	5322 126 11583	10nF 10% 50V 0603
2324	5322 126 11583	10nF 10% 50V 0603
2357	3198 035 71040	100nF 10% 16V 0402
2358	3198 035 03320	3.3nF 5% 50V 0402
2359	2020 552 96628	10nF 10% 16V 0402
2370	2020 552 96834	1µF 20% 6.3V 0402
2371	2020 552 96834	1µF 20% 6.3V 0402
2372	2020 552 96618	1nF 10% 50V 0402
2373	2020 552 96618	1nF 10% 50V 0402
2374	3198 035 71040	100nF 10% 16V 0402
2375	4822 124 12082	10µF 20% 50V
2376	3198 017 41050	1µF 10V 0603
2377	3198 017 41050	1µF 10V 0603
2378	2020 552 96718	220nF 10% 6.3V 0402
2380	4822 124 12095	100µF 20% 16V
2381	3198 035 71040	100nF 10% 16V 0402
2382	2022 031 00373	470µF 20% 16V
2386	3198 017 41050	1µF 10V 0603
2387	4822 126 14324	33pF 5% 50V 0402
2388	4822 126 14324	33pF 5% 50V 0402
2392	3198 017 41050	1µF 10V 0603
2394	3198 035 71040	100nF 10% 16V 0402
2395	3198 035 71040	100nF 10% 16V 0402
2396	4822 124 23002	10µF 16V
2397	2020 552 96834	1µF 20% 6.3V 0402
2398	2020 552 96834	1µF 20% 6.3V 0402
2401	4822 124 80151	47µF 16V
2402	4822 124 80151	47µF 16V
2403	3198 035 71040	100nF 10% 16V 0402
2404	3198 035 71040	100nF 10% 16V 0402
2405	3198 035 71040	100nF 10% 16V 0402
2406	3198 035 71040	100nF 10% 16V 0402
2407	3198 035 71040	100nF 10% 16V 0402
2408	3198 035 71040	100nF 10% 16V 0402
2409	3198 035 71040	100nF 10% 16V 0402
2410	3198 035 71040	100nF 10% 16V 0402
2411	3198 035 71040	100nF 10% 16V 0402
2412	3198 035 71040	100nF 10% 16V 0402
2413	3198 035 71040	100nF 10% 16V 0402
2414	3198 035 71040	100nF 10% 16V 0402
2415	3198 035 71040	100nF 10% 16V 0402
2416	3198 035 71040	100nF 10% 16V 0402
2417	4822 124 80151	47µF 16V
2418	4822 124 80151	47µF 16V
2419	3198 035 71040	100nF 10% 16V 0402
2420	3198 035 71040	100nF 10% 16V 0402
2421	3198 035 71040	100nF 10% 16V 0402
2422	3198 035 71040	100nF 10% 16V 0402
2423	3198 035 71040	100nF 10% 16V 0402
2424	3198 035 71040	100nF 10% 16V 0402
2425	3198 035 71040	100nF 10% 16V 0402
2426	3198 035 71040	100nF 10% 16V 0402
2427	3198 035 71040	100nF 10% 16V 0402
2428	3198 035 71040	100nF 10% 16V 0402
2429	3198 035 71040	100nF 10% 16V 0402
2430	3198 035 71040	100nF 10% 16V 0402
2431	3198 035 71040	100nF 10% 16V 0402
2432	3198 035 71040	100nF 10% 16V 0402
2433	3198 035 71040	100nF 10% 16V 0402
2434	4822 124 80151	47µF 16V
2435	4822 124 80151	47µF 16V
2436	3198 035 71040	100nF 10% 16V 0402
2437	3198 035 71040	100nF 10% 16V 0402
2438	3198 035 71040	100nF 10% 16V 0402
2439	3198 035 71040	100nF 10% 16V 0402
2440	3198 035 71040	100nF 10% 16V 0402
2441	3198 035 71040	100nF 10% 16V 0402
2442	3198 035 71040	100nF 10% 16V 0402
2443	3198 035 71040	100nF 10% 16V 0402
2444	3198 035 71040	100nF 10% 16V 0402
2445	3198 035 71040	100nF 10% 16V 0402
2446	3198 035 71040	100nF 10% 16V 0402
2447	3198 035 71040	100nF 10% 16V 0402
2448	3198 035 71040	100nF 10% 16V 0402
2449	3198 035 71040	100nF 10% 16V 0402
2450	3198 035 71040	100nF 10% 16V 0402
2451	4822 124 80151	47µF 16V
2452	3198 035 71040	100nF 10% 16V 0402
2453	3198 035 71040	100nF 10% 16V 0402
2454	3198 035 71040	100nF 10% 16V 0402
2455	3198 035 71040	100nF 10% 16V 0402
2456	3198 035 71040	100nF 10% 16V 0402
2461	3198 035 71040	100nF 10% 16V 0402
2462	3198 035 71040	100nF 10% 16V 0402

2463	3198 035 71040	100nF 10% 16V 0402
2464	3198 035 71040	100nF 10% 16V 0402
2465	5322 124 41945	22µF 20% 35V
2466	3198 035 71040	100nF 10% 16V 0402
2467	3198 035 71040	100nF 10% 16V 0402
2468	3198 035 71040	100nF 10% 16V 0402
2469	3198 035 71040	100nF 10% 16V 0402
2470	5322 124 41945	22µF 20% 35V
2471	3198 035 71040	100nF 10% 16V 0402
2472	3198 035 71040	100nF 10% 16V 0402
2473	3198 035 71040	100nF 10% 16V 0402
2474	3198 035 71040	100nF 10% 16V 0402
2475	3198 035 71040	100nF 10% 16V 0402
2476	3198 035 71040	100nF 10% 16V 0402
2477	3198 035 71040	100nF 10% 16V 0402
2478	5322 124 41945	22µF 20% 35V
2479	3198 035 71040	100nF 10% 16V 0402
2480	3198 035 71040	100nF 10% 16V 0402
2481	3198 035 71040	100nF 10% 16V 0402
2482	5322 124 41945	22µF 20% 35V
2483	3198 035 71040	100nF 10% 16V 0402
2484	3198 035 71040	100nF 10% 16V 0402
2485	3198 035 71040	100nF 10% 16V 0402
2486	3198 035 71040	100nF 10% 16V 0402
2487	4822 126 14519	22pF 5% 50V 0402
2488	4822 126 14519	22pF 5% 50V 0402
2490	2238 586 59812	100nF 20% 50V 0603
2491	2238 586 59812	100nF 20% 50V 0603
2492	2238 586 59812	100nF 20% 50V 0603
2493	2020 552 96807	1µF 10% 10V 0603
2495	4822 124 80151	47µF 16V
2496	3198 035 71040	100nF 10% 16V 0402
2501	4822 124 80151	47µF 16V
2502	4822 124 11131	47µF 6.3V
2503	3198 035 71040	100nF 10% 16V 0402
2504	3198 035 71040	100nF 10% 16V 0402
2505	3198 035 71040	100nF 10% 16V 0402
2506	3198 035 71040	100nF 10% 16V 0402
2507	3198 035 71040	100nF 10% 16V 0402
2508	3198 035 71040	100nF 10% 16V 0402
2509	3198 035 71040	100nF 10% 16V 0402
2510	3198 035 71040	100nF 10% 16V 0402
2511	3198 035 71040	100nF 10% 16V 0402
2512	3198 035 71040	100nF 10% 16V 0402
2513	3198 035 71040	100nF 10% 16V 0402
2514	3198 035 71040	100nF 10% 16V 0402
2515	3198 035 71040	100nF 10% 16V 0402
2516	3198 035 71040	100nF 10% 16V 0402
2517	3198 035 71040	100nF 10% 16V 0402
2526	5322 124 41945	22µF 20% 35V
2530	4822 124 23002	10µF 16V
2531	3198 035 71040	100nF 10% 16V 0402
2532	3198 035 71040	100nF 10% 16V 0402
2533	3198 035 71040	100nF 10% 16V 0402
2560	3198 035 71040	100nF 10% 16V 0402
2561	4822 124 12095	100µF 20% 16V
2562	3198 035 71040	100nF 10% 16V 0402
2564	2020 552 96656	10µF 20% 25V 1210
2580	3198 035 71040	100nF 10% 16V 0402
2581	3198 035 71040	100nF 10% 16V 0402
2582	3198 035 71040	100nF 10% 16V 0402
2583	3198 035 71040	100nF 10% 16V 0402
2584	3198 035 71040	100nF 10% 16V 0402
2585	2238 869 75829	82pF 5% 50V 0402
2586	2238 869 75829	82pF 5% 50V 0402
2587	3198 035 03310	330pF 5% 50V 0402
2588	3198 035 04710	470pF 50V 0402
2605	3198 035 71040	100nF 10% 16V 0402
2606	3198 035 71040	100nF 10% 16V 0402
2607	3198 035 71040	100nF 10% 16V 0402
2608	3198 035 71040	100nF 10% 16V 0402
2609	3198 035 71040	100nF 10% 16V 0402
2610	3198 035 71040	100nF 10% 16V 0402
2611	4822 124 11131	47µF 6.3V
2612	2020 552 96628	10nF 10% 16V 0402
2613	2020 552 96628	10nF 10% 16V 0402
2614	2020 552 96628	10nF 10% 16V 0402
2615	2020 552 96628	10nF 10% 16V 0402
2616	2020 552 96628	10nF 10% 16V 0402
2617	2020 552 96628	10nF 10% 16V 0402
2618	2020 552 96628	10nF 10% 16V 0402
2619	4822 126 14324	33pF 5% 50V 0402
2620	2020 552 96807	1µF 10% 10V 0603
2621	2020 552 96834	1µF 20% 6.3V 0402
2622	2020 552 96834	1µF 20% 6.3V 0402
2623	2020 552 96834	1µF 20% 6.3V 0402
2624	3198 017 44740	470nF 10V 0603
2625	3198 017 44740	470nF 10V 0603
2626	3198 017 44740	470nF 10V 0603
2630	2020 552 96834	1µF 20% 6.3V 0402
2631	2020 552 96834	1µF 20% 6.3V 0402
2632	2020 552 96834	1µF 20% 6.3V 0402
2633	2020 552 96834	1µF 20% 6.3V 0402
2634	2020 552 96834	1µF 20% 6.3V 0402
2635	2020 552 96834	1µF 20% 6.3V 0402
2636	3198 035 71040	100nF 10% 16V 0402
2681	2020 552 94427	100pF 5% 50V
2686	2020 552 94427	100pF 5% 50V
2688	2238 586 59812	100nF 20% 50V 0603
2693	2238 586 59812	100nF 20% 50V 0603
2698	2020 552 94427	100pF 5% 50V
2699	2020 552 94427	100pF 5% 50V
2702	2020 552 96834	1µF 20% 6.3V 0402
2707	2022 031 00373	470µF 20% 16V
2708	2020 552 96834	1µF 20% 6.3V 0402
2710	3198 035 04710	470pF 50V 0402
2711	3198 035 04710	470pF 50V 0402
2713	2238 586 59812	100nF 20% 50V 0603
2714	2020 012 00028	470µF 20% 16V
2715	2022 031 00373	470µF 20% 16V
2719	2238 586 59812	100nF 20% 50V 0603
2720	2238 869 15109	10pF 5% 50V 0402
2743	2020 552 96834	1µF 20% 6.3V 0402
2744	2020 552 96834	1µF 20% 6.3V 0402
2747	2238 869 15101	100pF 5% 50V 0402
2748	2238 869 15101	100pF 5% 50V 0402
2749	2238 869 15101	100pF 5% 50V 0402
2750	2238 869 15101	100pF 5% 50V 0402
2784	4822 126 14241	330pF 0603 50V
2785	4822 126 14241	330pF 0603 50V
2847	3198 017 41050	1µF 10V 0603
2848	3198 017 41050	1µF 10V 0603
2860	2238 869 15109	10pF 5% 50V 0402
2861	2238 869 15109	10pF 5% 50V 0402
2862	2238 869 15109	10pF 5% 50V 0402
2863	2238 869 15109	10pF 5% 50V 0402
2864	2238 869 15109	10pF 5% 50V 0402
2865	2238 869 15109	10pF 5% 50V 0402
2866	2238 869 15109	10pF 5% 50V 0402
2867	2238 869 15109	10pF 5% 50V 0402
2868	2238 869 15109	10pF 5% 50V 0402
2869	2238 869 15109	10pF 5% 50V 0402
2874	2238 869 15109	10pF 5% 50V 0402
2875	2238 869 15109	10pF 5% 50V 0402
2876	2020 552 96628	10nF 10% 16V 0402
2877	2238 869 15109	10pF 5% 50V 0402
2878	2020 552 96628	10nF 10% 16V 0402
2879	2020 552 96628	10nF 10% 16V 0402
2880	2238 869 15109	10pF 5% 50V 0402
2881	2020 552 96628	10nF 10% 16V 0402
2883	2238 869 15109	10pF 5% 50V 0402
2887	2238 869 15109	10pF 5% 50V 0402
2910	3198 035 04710	470pF 50V 0402
2911	2022 031 00308	22µF 20% 35V
2920	4822 124 80151	47µF 16V
2921	4822 124 80151	47µF 16V
2930	2022 031 00373	470µF 20% 16V
2931	3198 035 04710	470pF 50V 0402
2933	2022 031 00373	470µF 20% 16V
2934	2020 552 96793	4.7nF 10% 50V 0402
2935	2022 031 00373	470µF 20% 16V
2953	2022 031 00373	470µF 20% 16V
2955	3198 035 14720	4.7nF 5% 25V 0402
2956	3198 035 02210	220pF 5% 50V 0402
2957	2022 031 00373	470µF 20% 16V
2958	2022 031 00373	470µF 20% 16V
2960	4822 124 80151	47µF 16V
2961	3198 035 71040	100nF 10% 16V 0402
2992	3198 035 71040	100nF 10% 16V 0402
2993	2020 552 96618	1nF 10% 50V 0402
2994	2022 031 00373	470µF 20% 16V
2995	3198 035 71040	100nF 10% 16V 0402
2996	4822 124 80151	47µF 16V
2999	2020 552 96637	10µF 10% 6.3V 0805

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3000	3198 031 05620	5.6kΩ 5% 0.01W 0402
3001	2322 702 70398	3.9Ω 5% 0603
3002	4822 117 13601	22kΩ 5% 0402
3003	2322 702 70398	3.9Ω 5% 0603
3004	4822 117 13601	22kΩ 5% 0402
3005	3198 031 05620	5.6kΩ 5% 0.01W 0402
3006	4822 117 13545	100Ω 1% 0402
3007	3198 031 04720	4.7kΩ 5% 0402
3008	3198 031 04730	47Ω 5% 0402
3009	4822 117 11297	100kΩ 5% 0.1W
3010	4822 117 13548	1kΩ 5% 0402
3011	3198 031 01820	1.8kΩ 5% 0.01W 0402
3013	4822 117 13545	100Ω 1% 0402
3015	4822 117 13605	Jumper 0402
3017	4822 117 13605	Jumper 0402
3019	4822 117 13545	100Ω 1% 0402
3020	4822 117 13548	1kΩ 5% 0402
3021	2322 706 72702	2.7kΩ 1% 0402
3022	4822 117 13606	10kΩ 5% 0.01W 0402
3023	4822 117 13601	22kΩ 5% 0402
3024	3198 031 01090	10Ω 5% 0.01W 0402
3025	3198 031 01090	10Ω 5% 0.01W 0402
3026	3198 031 06890	68Ω 5% 0402
3027	3198 031 01090	10Ω 5% 0.01W 0402
3028	4822 117 11297	100kΩ 5% 0.1W
3029	4822 117 13548	1kΩ 5% 0402
3030	4822 117 11297	100kΩ 5% 0.1W
3032	3198 031 02240	220kΩ 5% 0.1W 0402
3035	4822 117 13545	100Ω 1% 0402
3037	3198 031 04730	47Ω 5% 0402
3038	3198 031 04730	47Ω 5% 0402
3039	3198 031 06830	68kΩ 5% 0.01W 0402
3040	3198 031 06830	68kΩ 5% 0.01W 0402
3048	4822 117 13606	10kΩ 5% 0.01W 0402
3049	4822 117 13545	100Ω 1% 0402
3050	4822 117 13545	100Ω 1% 0402
3051	4822 117 13545	100Ω 1% 0402
3052	4822 117 13605	Jumper 0402
3056	4822 117 13548	1kΩ 5% 0402
3057	4822 117 13545	100Ω 1% 0402
3058	4822 117 13543	470Ω 5% 0402
3059	4822 117 13548	1kΩ 5% 0402
3060	3198 031 03930	39kΩ 5% 0402
3063	3198 031 06890	68Ω 5% 0402
3065	3198 031 06810	680Ω 5% 0.01W 0402
3066	3198 031 06890	68Ω 5% 0402
3067	3198 031 01090	10Ω 5% 0.01W 0402
3068	3198 031 06890	68Ω 5% 0402
3069	4822 117 13601	22kΩ 5% 0402
3070	4822 117 13545	100Ω 1% 0402
3072	4822 117 13605	Jumper 0402
3073	3198 031 01220	1.2kΩ 5% 0.01W 0402
3074	4822 117 11297	100kΩ 5% 0.1W
3075	3198 031 04720	4.7kΩ 5% 0402
3077	3198 031 04720	4.7kΩ 5% 0402
3078	3198 031 04720	4.7kΩ 5% 0402
3080	2322 704 61002	1kΩ 1%
3081	4822 117 13545	100Ω 1% 0402
3082	3198 031 04720	4.7kΩ 5% 0402
3083	3198 031 04720	4.7kΩ 5% 0402
3084	4822 117 13545	100Ω 1% 0402
3085	3198 031 04720	4.7kΩ 5% 0402
3086	4822 117 13602	2.2kΩ 5% 0.01W 0402
3087	4822 117 13606	10kΩ 5% 0.01W 0402
3088	3198 031 03320	3.3kΩ 5% 0402
3089	3198 031 01540	150kΩ 5% 0402
3091	4822 117 13545	100Ω 1% 0402
3092	3198 031 04720	4.7kΩ 5% 0402
3093	3198 031 04720	4.7kΩ 5% 0402
3094	3198 031 01090	10Ω 5% 0.01W 0402
3096	3198 031 03320	3.3kΩ 5% 0402
3097	3198 031 04720	4.7kΩ 5% 0402
3098	4822 117 13545	100Ω 1% 0402
3101	4822 051 30151	150Ω 5% 0.062W
3102	4822 117 12891	220kΩ 1%
3103	4822 051 30223	22kΩ 5% 0.062W
3104	4822 117 12925	47kΩ 1% 0.063W 0603
3105	4822 051 30151	150Ω 5% 0.062W
3106	4822 117 12891	220kΩ 1%
3107	4822 117 12925	47kΩ 1% 0.063W 0603
3108	4822 051 30223	22kΩ 5% 0.062W
3109	4822 051 30759	75Ω 5% 0.062W
3110	4822 051 30331	330Ω 5% 0.062W
3111	4822 051 30273	27kΩ 5% 0.062W
3112	4822 051 30682	6.8Ω 5% 0.062W
3113	4822 051 30759	75Ω 5% 0.062W
3114	4822 051 30331	330Ω 5% 0.062W
3115	4822 051 30759	75Ω 5% 0.062W
3116	4822 051 30331	330Ω 5% 0.062W
3117	4822 051 30331	330Ω 5% 0.062W
3118	4822 051 30759	75Ω 5% 0.062W
3119	4822 051 30689	68Ω 5% 0.063W 0603
3121	4822 051 30759	75Ω 5% 0.062W
3122	4822 051 30331	330Ω 5% 0.062W
3123	4822 051 30102	1kΩ 5% 0.062W
3124	4822 051 30151	150Ω 5% 0.062W
3125	4822 051 30151	150Ω 5% 0.062W
3126	4822 117 12891	220kΩ 1%
3127	4822 051 30151	150Ω 5% 0.062W
3128	4822 117 12925	47kΩ 1% 0.063W 0603
3129	4822 051 30151	150Ω 5% 0.062W
3130	4822 117 12891	220kΩ 1%
3131	4822 051 30151	150Ω 5% 0.062W
3132	4822 117 12925	47kΩ 1% 0.063W 0603
3133	4822 051 30223	22kΩ 5% 0.062W
3134	4822 051 30682	6.8Ω 5% 0.062W
3135	4822 051 30273	27kΩ 5% 0.062W
3136	4822 051 30331	330Ω 5% 0.062W
3137	4822 051 30759	75Ω 5% 0.062W
3138	4822 051 30223	22kΩ 5% 0.062W
3139	4822 051 30683	68kΩ 5% 0.062W
3140	4822 051 30689	68Ω 5% 0.063W 0603
3141	4822 051 30102	1kΩ 5% 0.062W
3142	4822 051 30331	330Ω 5% 0.062W

3143	4822 051 30759	75Ω 5% 0.062W
3144	4822 051 30151	150Ω 5% 0.062W
3145	4822 051 30151	150Ω 5% 0.062W
3146	4822 051 30151	150Ω 5% 0.062W
3147	4822 051 30151	150Ω 5% 0.062W
3148	4822 051 30151	150Ω 5% 0.062W
3149	4822 051 30223	22kΩ 5% 0.062W
3150	4822 051 30151	150Ω 5% 0.062W
3151	4822 051 30151	150Ω 5% 0.062W
3152	4822 117 12891	220kΩ 1%
3153	4822 051 30151	150Ω 5% 0.062W
3155	4822 117 12891	220kΩ 1%
3156	4822 051 30151	150Ω 5% 0.062W
3169	4822 117 12971	15Ω 5% 0603 0.62W
3251⚠	4822 117 11151	1Ω 5%
3270	3198 031 01520	1.2kΩ 5% 0.01W 0402
3271	3198 031 01520	1.2kΩ 5% 0.01W 0402
3273	3198 031 01530	15kΩ 5% 0.01W 0402
3274	4822 117 13601	22kΩ 5% 0402
3302	4822 051 30101	100Ω 5% 0.062W
3303	4822 051 30101	100Ω 5% 0.062W
3304	4822 117 13606	10kΩ 5% 0.01W 0402
3305	4822 117 13606	10kΩ 5% 0.01W 0402
3309	4822 117 13606	10kΩ 5% 0.01W 0402
3311	4822 051 30103	10kΩ 5% 0.062W
3319	4822 051 30273	27kΩ 5% 0.062W
3320	4822 051 30183	18kΩ 5% 0.062W
3321	4822 051 30222	2.2kΩ 5% 0.062W
3322	4822 051 30682	6.8Ω 5% 0.062W
3323	4822 051 30222	2.2kΩ 5% 0.062W
3327	4822 117 13548	1kΩ 5% 0402
3328	4822 117 13545	100Ω 1% 0402
3329	4822 117 13545	100Ω 1% 0402
3340	4822 117 13601	22kΩ 5% 0402
3342	3198 031 01530	15kΩ 5% 0.01W 0402
3343	3198 031 04720	4.7kΩ 5% 0402
3344	4822 117 13548	1kΩ 5% 0402
3345	3198 031 04720	4.7kΩ 5% 0402
3346	2322 706 75603	56kΩ 1% 0402
3347	3198 031 08210	820Ω 5% 0.5W
3348	3198 031 04720	4.7kΩ 5% 0402
3349	3198 031 01220	1.2kΩ 5% 0.01W 0402
3357	4822 117 13548	1kΩ 5% 0402
3358	4822 117 13545	100Ω 1% 0402
3359	3198 031 03910	390Ω 1% 0402
3370	3198 031 06810	680Ω 5% 0.01W 0402
3371	4822 117 13545	100Ω 1% 0402
3372	4822 117 13545	100Ω 1% 0402
3374⚠	5322 117 11726	10Ω 5%
3378	4822 117 13545	100Ω 1% 0402
3380	3198 031 08210	820Ω 5% 0.5W
3381	4822 117 13548	1kΩ 5% 0402
3382	3198 031 08210	820Ω 5% 0.5W
3383	4822 117 13548	1kΩ 5% 0402
3386	4822 117 13545	100Ω 1% 0402
3389	4822 117 13545	100Ω 1% 0402
3390	4822 117 13545	100Ω 1% 0402
3391	4822 117 13545	100Ω 1% 0402
3392	4822 117 13545	100Ω 1% 0402
3393	4822 117 13545	100Ω 1% 0402
3394	3198 031 07590	75Ω 5% 0402
3401	2350 035 10229	4 x 22Ω 5% 1206
3402	2350 035 10229	4 x 22Ω 5% 1206
3403	2350 035 10229	4 x 22Ω 5% 1206
3404	2350 035 10229	4 x 22Ω 5% 1206
3405	2350 035 10229	4 x 22Ω 5% 1206
3406	2350 035 10229	4 x 22Ω 5% 1206
3407	2350 035 10229	4 x 22Ω 5% 1206
3408	2350 035 10229	4 x 22Ω 5% 1206
3409	2350 035 10229	4 x 22Ω 5% 1206
3410	2350 035 10229	4 x 22Ω 5% 1206
3411	2350 035 10229	4 x 22Ω 5% 1206
3412	2350 035 10229	4 x 22Ω 5% 1206
3413	2350 035 10229	4 x 22Ω 5% 1206
3414	3198 031 02290	22Ω 5% 0.1W 0402
3415	3198 031 01090	10Ω 5% 0.01W 0402
3416	4822 117 13548	1kΩ 5% 0402
3417	4822 117 13548	1kΩ 5% 0402
3418	3198 031 03910	390Ω 1% 0402
3422	3198 031 02290	22Ω 5% 0.1W 0402
3423	3198 031 03320	3.3kΩ 5% 0402
3424	2322 704 61501	150Ω 1% 0603
3425	4822 117 13606	10kΩ 5% 0.01W 0402
3426	3198 031 03320	3.3kΩ 5% 0402
3428	4822 117 13606	10kΩ 5% 0.01W 0402
3429	4822 117 13606	10kΩ 5% 0.01W 0402
3432	4822 117 13606	10kΩ 5% 0.01W 0402
3433	4822 117 13606	10kΩ 5% 0.01W 0402
3436	4822 117 13606	10kΩ 5% 0.01W 0402
3437	4822 117 13606	10kΩ 5% 0.01W 0402
3438	3198 031 11030	4 x 10kΩ 5% 1206
3439	3198 031 11030	4 x 10kΩ 5% 1206
3440	3198 031 11030	4 x 10kΩ 5% 1206
3441	3198 031 11030	4 x 10kΩ 5% 1206
3442	3198 031 11030	4 x 10kΩ 5% 1206
3443	4822 117 13606	10kΩ 5% 0.01W 0402
3444	4822 051 30103	10kΩ 5% 0.062W
3446	2322 704 61001	100Ω 1% 0603
3447	3198 031 02290	22Ω 5% 0.1W 0402
3448	3198 031 01090	10Ω 5% 0.01W 0402
3501	4822 117 12706	10kΩ 1% 0.063W 0603
3502	4822 117 12706	10kΩ 1% 0.063W 0603
3503	2322 704 61501	150Ω 1% 0603
3531	4822 117 13606	10kΩ 5% 0.01W 0402
3532	4822 117 13606	10kΩ 5% 0.01W 0402
3534	4822 117 13548	1kΩ 5% 0402
3536	4822 117 13606	10kΩ 5% 0.01W 0402
3538	3198 031 11030	4 x 10kΩ 5% 1206
3539	3198 031 11030	4 x 10kΩ 5% 1206
3540	3198 031 11030	4 x 10kΩ 5% 1206
3544	3198 031 11030	4 x 10kΩ 5% 1206
3545	3198 031 11030	4 x 10kΩ 5% 1206
3546	3198 031 11030	4 x 10kΩ 5% 1206
3547	3198 031 11030	4 x 10kΩ 5% 1206
3548	4822 117 13606	10kΩ 5% 0.01W 0402
3550	4822 051 30102	1kΩ 5% 0.062W
3560	4822 117 11297	100kΩ 5% 0.1W
3561	4822 117 11297	100kΩ 5% 0.1W
3562	4822 117 11297	100kΩ 5% 0.1W
3570	4822 117 13548	1kΩ 5% 0402
3579	4822 117 13548	1kΩ 5% 0402
3580	4822 117 13543	470Ω 5% 0402
3581	3198 031 04730	47Ω 5% 0402
3605	4822 117 13545	100Ω 1% 0402
3606	4822 117 13545	100Ω 1% 0402
3607	4822 117 13545	100Ω 1% 0402
3608	4822 117 13545	100Ω 1% 0402
3609	4822 117 13545	100Ω 1% 0402
3610	4822 117 13601	22kΩ 5% 0402
3612	4822 117 13543	470Ω 5% 0402
3613	3198 031 02290	22Ω 5% 0.1W 0402
3614	3198 031 02290	22Ω 5% 0.1W 0402
3615	3198 031 02290	22Ω 5% 0.1W 0402
3616	3198 031 02290	22Ω 5% 0.1W 0402
3617	3198 031 02290	22Ω 5% 0.1W 0402
3618	3198 031 02290	22Ω 5% 0.1W 0402
3619	3198 031 08210	820Ω 5% 0.5W
3620	4822 117 13632	100kΩ 1% 0603 0.62W
3621	4822 117 13601	22kΩ 5% 0402
3622	4822 117 13601	22kΩ 5% 0402
3623	4822 117 13601	22kΩ 5% 0402
3624	4822 117 13601	22kΩ 5% 0402
3625	4822 117 13601	22kΩ 5% 0402
3626	4822 117 13601	22kΩ 5% 0402
3633	4822 117 13545	100Ω 1% 0402
3634	4822 117 13545	100Ω 1% 0402
3635	4822 117 13545	100Ω 1% 0402
3638	4822 117 13545	100Ω 1% 0402
3639	4822 117 13545	100Ω 1% 0402
3641	4822 117 13597	330Ω 5% 0402 0.01W
3642	4822 117 13597	330Ω 5% 0402 0.01W
3643	4822 117 13597	330Ω 5% 0402 0.01W
3644	4822 117 13597	330Ω 5% 0402 0.01W
3645	4822 117 13597	330Ω 5% 0402 0.01W
3646	4822 117 13597	330Ω 5% 0402 0.01W
3680	4822 051 30222	2.2kΩ 5% 0.062W
3681	4822 051 30221	220Ω 5% 0.062W
3683	4822 051 30759	75Ω 5% 0.062W
3684	4822 051 30759	75Ω 5% 0.062W
3685	4822 051 30222	2.2kΩ 5% 0.062W
3686	4822 051 30221	220Ω 5% 0.062W
3687	4822 051 30759	75Ω 5% 0.062W
3689	4822 051 30101	100Ω 5% 0.062W
3693	4822 051 30103	10kΩ 5% 0.062W
3696	4822 051 30103	10kΩ 5% 0.062W
3697	4822 051 30103	10kΩ 5% 0.062W
3698	4822 051 30223	22kΩ 5% 0.062W
3699	4822 051 30223	22kΩ 5% 0.062W
3700	4822 117 12925	47kΩ 1% 0.063W 0603
3701	4822 117 13548	1kΩ 5% 0402
3702	4822 117 13602	2.2kΩ 5% 0.01W 0402
3703	4822 117 13606	10kΩ 5% 0.01W 0402
3704	4822 117 13543	470Ω 5% 0402
3705	4822 117 13606	10kΩ 5% 0.01W 0402
3711	3198 031 03390	33Ω 1% 0402
3712	4822 117 13606	10kΩ 5% 0.01W 0402
3713	4822 117 13606	10kΩ 5% 0.01W 0402
3716	4822 117 13543	470Ω 5% 0402
3718	3198 031 03390	33Ω 1% 0402
3721	4822 117 13543	470Ω 5% 0402
3728	4822 117 13605	Jumper 0402
3739	4822 117 13601	22kΩ 5% 0402
3740	4822 117 13601	22kΩ 5% 0402
3741	4822 117 11297	100kΩ 5% 0.1W
3742	4822 117 13601	22kΩ 5% 0402
3743	4822 117 13601	22kΩ 5% 0402
3745	4822 117 11297	100kΩ 5% 0.1W
3747	4822 117 13605	Jumper 0402
3752	3198 031 01510	150Ω 5% 0.01W 0402
3753	3198 031 01510	150Ω 5% 0.01W 0402
3781	4822 117 12925	47kΩ 1% 0.063W 0603
3782	4822 051 30151	150Ω 5% 0.062W
3783	4822 051 30103	10kΩ 5% 0.062W
3784	4822 051 30102	1kΩ 5% 0.062W
3788	4822 051 30102	1kΩ 5% 0.062W
3836	4822 117 13606	10kΩ 5% 0.01W 0402
3838	4822 117 13606	10kΩ 5% 0.01W 0402
3876	3198 031 06890	68Ω 5% 0402
3877	3198 031 06890	68Ω 5% 0402
3879	3198 031 06890	68Ω 5% 0402
3883	3198 031 06890	68Ω 5% 0402
3910	4822 117 13602	2.2kΩ 5% 0.01W 0402
3911	4822 117 13548	1kΩ 5% 0402
3930	3198 021 31080	1Ω 5% 0603
3931	3198 021 31080	1Ω 5% 0603
3932	2322 704 61002	1kΩ 1%
3933	2322 704 63302	3.3kΩ 1% 0603
3951	3198 021 31080	1Ω 5% 0603
3952	3198 021 31080	1Ω 5% 0603
3953	2322 704 61002	1kΩ 1%
3954	2322 704 63302	3.3kΩ 1% 0603
3955	4822 117 13606	10kΩ 5% 0.01W 0402
3958	3198 031 01530	15kΩ 5% 0.01W 0402
4xxx	4822 117 13605	Jumper 0402

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5001	2422 536 00667	1000µF 20% 7032
5002	4822 157 11716	Bead 30Ω at 100MHz
5003	4822 157 11716	Bead 30Ω at 100MHz
5004	4822 157 11716	Bead 30Ω at 100MHz
5005	4822 157 11716	Bead 30Ω at 100MHz
5006	4822 157 11716	Bead 30Ω at 100MHz
5007	4822 157 11716	Bead 30Ω at 100MHz
5008	4822 157 11716	Bead 30Ω at 100MHz
5010	3198 018 64790	47µF 5% 1008
5060	4822 157 11716	Bead 30Ω at 100MHz
5070	4822 157 11716	Bead 30Ω at 100MHz
5071	2422 549 42896	Bead 120Ω 100MHz
5072	2422 549 42896	Bead 120Ω 100MHz
5139	4822 051 20008	Jumper 0805
5251	2422 549 45333	Bead 120Ω 100MHz
5252	2422 549 45333	Bead 120Ω 100MHz
5253	2422 549 45333	Bead 120Ω 100MHz
5254	2422 549 45333	Bead 120Ω 100MHz
5257	2422 549 45333	Bead 120Ω 100MHz
5258	2422 549 45333	Bead 120Ω 100MHz
5259	2422 549 45333	Bead 120Ω 100MHz
5304	4822 157 11499	Bead 60Ω at 100MHz
5321	3198 018 33970	0.39µF 10% 0805
5324	4822 157 71334	0.68µH 5% 1008
5370	4822 157 11716	Bead 30Ω at 100MHz
5371	4822 157 11716	Bead 30Ω at 100MHz
5372	4822 157 11716	Bead 30Ω at 100MHz
5530	2422 549 45333	Bead 120Ω 100MHz
5560	4822 157 11716	Bead 30Ω at 100MHz
5580	3198 018 31080	1µF 10% 0805
5605	2422 549 45333	Bead 120Ω 100MHz
5607	2422 549 45333	Bead 120Ω 100MHz
5636	2422 549 45333	Bead 120Ω 100MHz
5680	2422 549 45333	Bead 120Ω 100MHz
5683	2422 549 45333	Bead 120Ω 100MHz
5684	2422 549 45333	Bead 120Ω 100MHz
5685	2422 549 45333	Bead 120Ω 100MHz
5686	2422 549 45333	Bead 120Ω 100MHz
5687	2422 549 45333	Bead 120Ω 100MHz
5720	4822 157 11716	Bead 30Ω at 100MHz
5721	4822 157 11716	Bead 30Ω at 100MHz
5722	4822 157 11716	Bead 30Ω at 100MHz
5874	2422 549 45333	Bead 120Ω 100MHz
59xx	2422 536 00667	1000µF 20% 7032

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6001	4822 130 11397	BAS316
6005	9340 553 52115	BAS321
6020	4822 130 11397	BAS316
6021	4822 130 11397	BAS316
6073	4822 130 80622	BAT54
6121	4822 130 11416	PDZ6.8B
6143	4822 130 11416	PDZ6.8B
6270	4822 130 10837	UDZS8.2B
6310	4822 130 11397	BAS316
6323	4822 130 11525	1SS356
6328	4822 130 11416	PDZ6.8B
6329	4822 130 11416	PDZ6.8B
6330	4822 130 11416	PDZ6.8B
6331	4822 130 11416	PDZ6.8B
6565	4822 130 10838	UDZ3.3B
6604	4822 130 11397	BAS316

6605	4822 130 11397	BAS316
6634	9322 102 64685	UDZ2.7B
6635	9322 102 64685	UDZ2.7B
6638	9322 102 64685	UDZ2.7B
6639	9322 102 64685	UDZ2.7B
6693	4822 130 11397	BAS316
6701	3198 018 33970	0.39µF 10% 0805
6910	5322 130 34337	BAV99
6911	9340 548 71115	PDZ33B
6930	9322 128 70685	SMSS14
6951	9322 128 70685	SMSS14

7001	9339 693 90135	BCP69-25
7002	9340 425 20115	BC847BS
7003	9339 693 90135	BCP69-25
7004	3198 010 42310	BC847BW
7005	9340 547 13215	BSH103
7011	9352 761 83557	TDA15021H/N1A11
7012	3198 010 42310	BC847BW
7013	3198 010 42310	BC847BW
7014	3198 010 42310	BC847BW
7015	9322 208 05668	SM NE555D
7016	9322 208 05668	SM NE555D
7017	9322 208 05668	SM NE555D
7018	5322 130 60159	BC846B
7019	5322 130 60159	BC846B
7070	9340 547 13215	BSH103
7075	4822 130 11155	PDTC114ET
7099	9322 214 45668	M24C16-WMN6P
7119	5322 130 60159	BC846B
7138	5322 130 42755	BC847C
7271	3198 010 42310	BC847BW
7272	3198 010 42310	BC847BW
7320	3198 010 42310	BC847BW
7370	9340 550 49115	PUMH7
7371	9340 550 49115	PUMH7
7372	9340 550 49115	PUMH7
7376	9340 425 10115	BC857BS
7377	9340 425 10115	BC857BS
7401	9322 200 07671	GM1501-LF-BD
7416	9322 214 00668	SI2301BDS-E3
7501	9322 214 42671	K4D263238F-QC50
7530	9322 205 12671	MX29LV040QC-70G
7531	9322 206 23668	M24C32-WMN6P
7532	9322 215 39685	PST596JN
7560	4822 209 17311	TDA9178T/N1
7562	9322 199 24668	L7808CD2T
7579	4822 130 11155	PDTC114ET
7580	9322 199 16668	M74HC590T
7581	9322 199 16668	M74HC590T
7582	9322 208 98668	M68AF031AM70N6
7583	9351 870 00118	74HC573PW
7584	9351 870 00118	74HC573PW
7585	3198 010 42310	BC847BW
7604	9352 607 39118	74LVC14APW
7605	4822 209 60792	74HC4053D
7606	9322 199 56668	ADG781BCP
7607	9322 199 80668	SM5301BS-G
7693	9322 206 24668	M24C02-WMN6P
7706	9351 742 70118	74HC08PW
7708	9340 425 20115	BC847BS
7710	9340 310 50215	PDTA143ET
7714	3198 010 42310	BC847BW
7740	9322 183 05668	TS482ID
7910	4822 130 42804	BC817-25
7920	9322 163 24668	L78M08CDT
7930	5322 209 90529	MC34063AD
7952	5322 209 90529	MC34063AD
7954	9322 214 00668	SI2301BDS-E3
7955	4822 130 11155	PDTC114ET
7992	9322 142 88668	LF25CDT
7995	9322 189 19668	LD1086D2T18

Audio Amplifier [C]

Various

0100	3139 129 90041	PROCESS BOX PCB PNL LFS
1001	2422 025 09406	Connector 4p m
1002	2422 025 10769	Connector 9p m
1003	2422 025 10768	Connector 3p m

2001	2020 024 00023	220µ 35V
2002	2238 586 59812	100nF 20% 50V 0603
2003	2238 586 59812	100nF 20% 50V 0603
2004	2020 024 00023	220µ 35V
2006	2020 552 94427	100pF 5% 50V
2007	2020 552 94427	100pF 5% 50V
2008	2020 552 94427	100pF 5% 50V
2009	2020 552 94427	100pF 5% 50V
2010	2238 586 59812	100nF 20% 50V 0603
2011	4822 051 30562	5.6kΩ 5% 0.063W 0603
2012	2020 024 00023	220µ 35V
2013	4822 126 13879	220nF +80-20% 16V
2014	4822 126 14238	2.2nF 50V 0603
2015	4822 126 14238	2.2nF 50V 0603
2016	4822 126 14238	2.2nF 50V 0603
2017	2238 586 59812	100nF 20% 50V 0603
2018	3198 017 31530	15nF 20% 50V 0603
2019	3198 037 52280	2.2µ 50V
2020	4822 126 13883	220pF 5% 50V
2021	4822 126 13883	220pF 5% 50V
2022	4822 126 14076	220nF +80/-20% 25V
2023	4822 121 51252	470nF 5% 63V
2024	2020 012 00036	1000µ 25V
2026	4822 126 13879	220nF +80-20% 16V
2027	2238 586 59812	100nF 20% 50V 0603
2028	2238 586 59812	100nF 20% 50V 0603
2029	2020 024 00023	220µ 35V
2030	4822 126 14238	2.2nF 50V 0603
2031	4822 126 14238	2.2nF 50V 0603
2032	4822 126 14238	2.2nF 50V 0603
2033	4822 126 13879	220nF +80-20% 16V
2034	2238 586 59812	100nF 20% 50V 0603
2035	4822 126 13883	220pF 5% 50V
2036	4822 126 13883	220pF 5% 50V
2037	3198 037 52280	2.2µ 50V
2038	3198 017 31530	15nF 20% 50V 0603
2039	2020 552 96656	10µF 20% 25V 1210
2040	4822 126 13879	220nF +80-20% 16V
2041	2020 552 96656	10µF 20% 25V 1210
2042	4822 121 51252	470nF 5% 63V
2043	2020 012 00036	1000µ 25V
2044	2238 586 59812	100nF 20% 50V 0603
2045	4822 126 14076	220nF +80/-20% 25V
2047	3198 017 41050	1µF 10V 0603
2048	2238 586 59812	100nF 20% 50V 0603
2051	2020 552 94427	100pF 5% 50V
2052	4822 126 14238	2.2nF 50V 0603
2053	4822 126 14238	2.2nF 50V 0603
2054	4822 126 14238	2.2nF 50V 0603
2055	4822 126 14238	2.2nF 50V 0603
2060	4822 126 14238	2.2nF 50V 0603
2061	4822 126 14238	2.2nF 50V 0603
2062	3198 017 34730	47nF 16V 0603
2063	3198 017 34730	47nF 16V 0603
2064	5322 126 11579	3.3nF 10% 63V
2065	5322 126 11579	3.3nF 10% 63V

3001	5322 117 11726	10Ω 5%
3003	4822 051 30223	22kΩ 5% 0.062W
3004	4822 051 30103	10kΩ 5% 0.062W
3006	4822 051 30102	1kΩ 5% 0.062W
3007	4822 117 12925	47kΩ 1% 0.063W 0603
3008	4822 051 30222	2.2kΩ 5% 0.062W
3009	4822 117 12891	220kΩ 1%
3010	4822 051 30682	6.8Ω 5% 0.062W
3011	4822 051 30222	2.2kΩ 5% 0.062W
3012	4822 051 20109	10Ω 5% 0.1W
3013	4822 051 30103	10kΩ 5% 0.062W
3014	2322 762 60229	22Ω 5% 1005
3019	4822 051 30103	10kΩ 5% 0.062W
3020	4822 051 30103	10kΩ 5% 0.062W
3021	4822 051 30472	4.7Ω 5% 0.062W
3022	9965 000 23109	22Ω 5% 0603
3023	4822 051 30102	1kΩ 5% 0.062W
3024	4822 117 12925	47kΩ 1% 0.063W 0603
3025	4822 051 30222	2.2kΩ 5% 0.062W
3026	4822 051 30682	6.8Ω 5% 0.062W
3027	4822 117 12891	220kΩ 1%
3028	4822 051 30103	10kΩ 5% 0.062W
3029	4822 051 30222	2.2kΩ 5% 0.062W
3030	4822 051 20109	10Ω 5% 0.1W
3031	2322 762 60229	22Ω 5% 1005
3032	4822 051 30392	3.9Ω 5% 0.063W 0603
3033	4822 051 30103	10kΩ 5% 0.062W
3034	4822 051 30392	3.9Ω 5% 0.063W 0603
3037	4822 051 30392	3.9Ω 5% 0.063W 0603
3039	4822 051 30103	10kΩ 5% 0.062W
3040	4822 051 30103	10kΩ 5% 0.062W
3041	4822 051 30103	10kΩ 5% 0.062W
3042	4822 051 30103	10kΩ 5% 0.062W
3043	4822 051 30103	10kΩ 5% 0.062W
3046	4822 051 30102	1kΩ 5% 0.062W
3047	4822 051 30102	1kΩ 5% 0.062W

5001	2422 549 44197	Bead 220Ω at 100MHz
5002	3198 018 52280	2.2µF 10% 1008
5003	3198 018 52280	2.2µF 10% 1008
5004	3198 018 52280	2.2µF 10% 1008
5005	3198 018 52280	2.2µF 10% 1008
5006	2422 536 01034	33µ
5007	2422 536 01034	33µ

6002	4822 130 80622	BAT54
6003	4822 130 80622	BAT54

7000	9352 760 45118	TDA8931T/N1
7001	9352 760 45118	TDA8931T/N1
7004	9322 209 56685	TL431ACDBV

Side AV Panel [D]

Various

0100	3139 129 90041	PROCESS BOX PCB PNL LFS
1301	4822 267 10484	YKF51-5359
1302	2422 026 05655	Socket CINCH 3P F RDWDYE
1303	2422 026 05059	Connector Phone
1304	2422 025 10772	Connector 12p m

2302	4822 126 11785	47pF 5% 50V 0603
2304	4822 126 11785	47pF 5% 50V 0603
2306	4822 126 14241	330pF 0603 50V
2307	4822 126 14241	330pF 0603 50V
2308	5322 126 11583	10nF 10% 50V 0603
2309	5322 126 11583	10nF 10% 50V 0603
2310▲	3198 017 41050	1µF 10V 0603

3301	4822 051 30759	75Ω 5% 0.062W
3302	4822 051 30109	10Ω 5% 0.062W
3303	4822 051 30109	10Ω 5% 0.062W
3304	4822 051 30759	75Ω 5% 0.062W
3305	4822 117 13632	100kΩ 1% 0603 0.62W
3306	4822 051 30153	15kΩ 5% 0.062W
3307	4822 051 30102	1kΩ 5% 0.062W
3308	4822 051 30153	15kΩ 5% 0.062W
3309▲	4822 051 30759	75Ω 5% 0.062W
3310▲	4822 051 30563	56kΩ 5% 0.062W
3311	4822 051 30103	10kΩ 5% 0.062W

6301	9322 129 41685	BZM55-C12
6302	9322 129 41685	BZM55-C12
6303	9322 129 41685	BZM55-C12
6304	9322 129 41685	BZM55-C12
6305	9322 129 41685	BZM55-C12
6306	9322 129 41685	BZM55-C12
6307	9322 129 41685	BZM55-C12
6308	9322 129 41685	BZM55-C12

7301▲	4822 130 60373	BC856B

Keybord Control [E]

Various

8684	3139 131 04421	Cable 03P/340/03P

IR/LEDLight-Sensor [J]

Various

1870	4822 265 31067	Connector 7p m

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2801	2020 552 96637	10µF 10% 6.3V 0805
2802	2020 552 96637	10µF 10% 6.3V 0805
2803	3198 017 41050	1µF 10V 0603

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3801	4822 051 30332	3.3Ω 5% 0.062W
3802	4822 051 30331	330Ω 5% 0.062W
3803	4822 051 30221	220Ω 5% 0.062W
3809	3198 021 32250	2.2MΩ 5% 0603

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6801	9322 192 35676	SPR-325MVW
6803	4822 130 11564	UDZ3.9B

7801	4822 130 60373	BC856B
7802	9322 207 16667	TSOP34836LL1B
7803	5322 130 60159	BC846B
7804	5322 130 60159	BC846B
7808	9322 190 43682	BPW34

11. Revision List

Manual xxxx xxx xxxx.0

- First release.